HIGHLIGHTS

REVISION NO. 33 Jun 01/10

Pages which have been revised are outlined below, together with the Highlights of the Revision

CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
CHAPTER 29		
L.E.P. 1- 8	Revised to Reflect this revision indicating new,revised, and/or deleted pages	
T. OF C. 1- 11	Revised to reflect this revision	
29-00-00 307- 309, 311	Minor additions and amplification REVISED TITLE	
29-00-00 604- 605, 608- 615	Minor additions and amplification ADDED PIPE-TO-FITTING CONNECTION LIMITS	
29-10-00 501- 502	Minor additions and amplification ADDED SNAPWIRE REFERENCE	
29-11-32 01 401- 402, 405- 410	Minor additions and amplification ADDED SNAPWIRE REFERENCE	
29-11-32 02 401- 402, 404- 407	Minor additions and amplification ADDED SNAPWIRE REFERENCE	
29-11-36 01 301- 302	Minor, non technical corrections REVISED TABLE	
29-11-36 01 401- 402	Minor, non technical corrections REVISED TABLE	
29-11-42 302	Minor additions and amplification REVISED LOCATION OF FILTER 292048	
29-11-69 02 403	Minor additions and amplification REVISED VIEW OF GREEN AND BLUE/YELLOW HYDRAULIC LINES	
29-12-69 02	Minor additions and amplification	

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CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
403	REVISED VIEW OF GREEN AND BLUE/YELLOW HYDRAULIC LINES	
29-14-14 401	Reprinted	
29-24-27 401	Reprinted	
29-25-00 505, 508, 510, 514- 516, 520- 525	Minor, non technical corrections REVISED STEP NUMBER Minor additions and amplification ADDED NEW WARNING FOR INSTALLATION OF THE RAT	
29-25-00 613- 615	Layout Improved or Effectivity Updated	
29-31-12 401	Minor, non technical corrections REVISED TABLE	
29-31-14 401	Minor, non technical corrections REVISED TABLE	
29-31-16 401	Minor, non technical corrections REVISED TABLE	

CHAPTER 29

HYDRAULIC POWER

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively
Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary

CH/SE/SU	C	PAGE	DATE
RECORD OF TEMP. REVISION			
L.E.P.	R	1- 8	Jun01/10
T. of C.	R	1	Jun01/10
T. of C.	R	2	Jun01/10
T. of C.	R	3	Jun01/10
T. of C.	R	4	Jun01/10
T. of C.	R	5	Jun01/10
T. of C.	R	6	Jun01/10
T. of C.	R	7	Jun01/10
T. of C.	R	8	Jun01/10
T. of C.	R	9	Jun01/10
T. of C.	R	10	Jun01/10
T. of C.	R	11	Jun01/10
29-00-00		1	Jun01/05
29-00-00		2	Jun01/08
29-00-00		3	Jun01/08
29-00-00		4	Dec01/90
29-00-00		5	Dec01/90
29-00-00		6	Dec01/90
29-00-00		7	Mar01/03
29-00-00		8	Jun01/08
29-00-00		9	Dec01/90
29-00-00		10	Dec01/90
29-00-00		11	Dec01/90
29-00-00		12	Dec01/90
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29-00-00		25	Jun01/06
29-00-00		26	Jun01/05
29-00-00		27	Jun01/06
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29-00-00		606	Jun01/04

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CH/SE/SU	C	PAGE	DATE
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29-00-00	R	613	Jun01/10
29-00-00	R	614	Jun01/10
29-00-00	R	615	Jun01/10
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CH/SE/SU	C	PAGE	DATE
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CH/SE/SU	C	PAGE	DATE
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29-11-51		401	Jun01/05

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29-33-00		3	Jun01/07
29-33-00		4	Dec01/90
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CHAPTER 29

HYDRAULIC POWER

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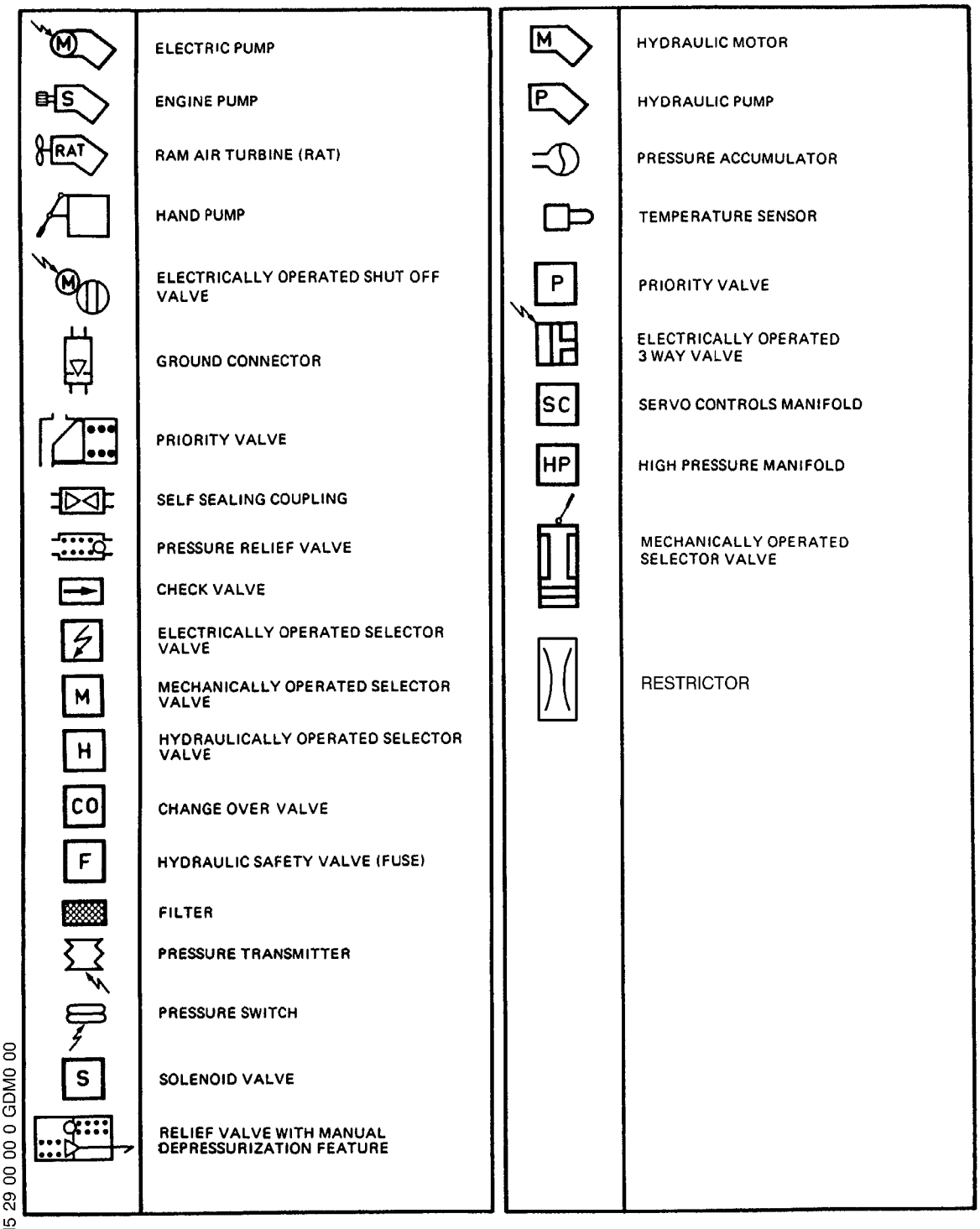
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R



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Symbols
Figure 001

R

R

1. General

Hydraulic power is used to operate high power demand services :

. Flight controls ATA 27
. Landing gear ATA 32
. Cargo compartment doors ATA 52

to a degree of safety compatible with minimum weight requirements.
The degree of reliability to be demonstrated in the Safety Analysis is associated with application of the following principles :

. Redundancy of power supply and actuating components leading to adoption of three fully independent systems (the flight controls having to survive a double failure), pressurized by at least two independent means.
. Isolation - of the three systems from each other
- of unused, jammed or damaged users (Electrovalves)
- of large power consumers, (landing gear, slats and flaps) from the flight controls, which have priority in the event of pressure drops (Priority valves).
. Monitoring - permanent monitoring with warnings and a display of corrective actions, indications and system status on CRT display units.
- periodic monitoring by pre-flight or inflight tests.
R . Inhibition of certain electrical controls by cutting off both the electri-
R cal ground and power supply circuits to avoid inadvertent commands.

All general precautions for ensuring safety are observed, as also all those specified in the applicable regulations, in particular as regards the following points :

. Vibrations, surge damping, back pressure : accumulators, flexible hoses, check valves...
. System cleanliness and bleeding, filtering, hydraulic fluid emulsion and hydrolysis,
. Risks of contamination and fire,
. System segregation and protection of vulnerable sections.
. Control component and pipe clearances,
. Use of appropriate materials compatible with weight requirements,
. Static strength throughout the flight envelope, fatigue strength and corrosion resistance,
. Accessibility, identification, fool proofing and ease of installation, (these also facilitate maintenance), modular design of components, their assembly on mounting plates or the facility to isolate sub-systems and hydraulic motors or pumps.

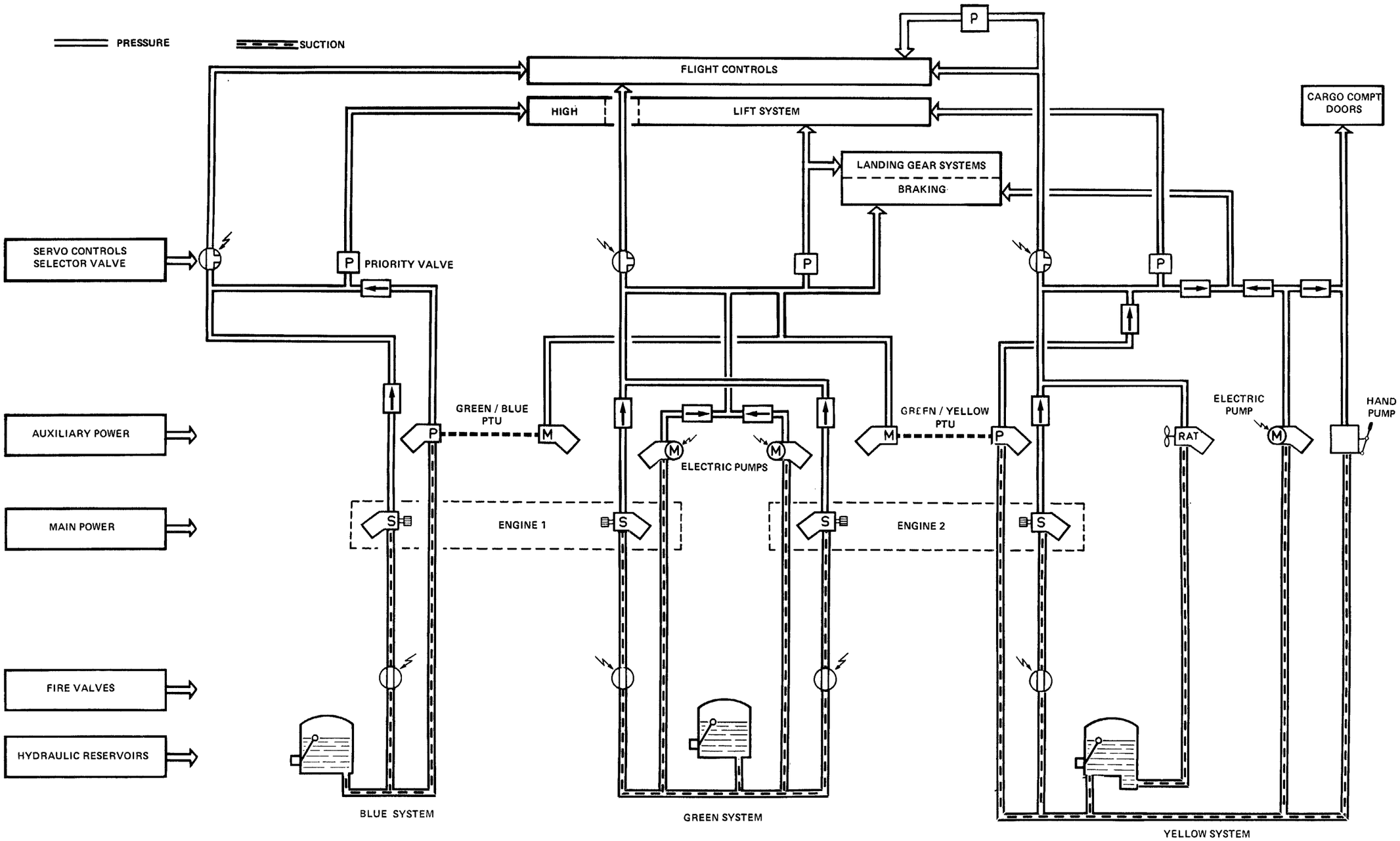
2. General Description - Layout

A. General Description

(Ref. Fig. 002)
(Ref. Fig. 003)

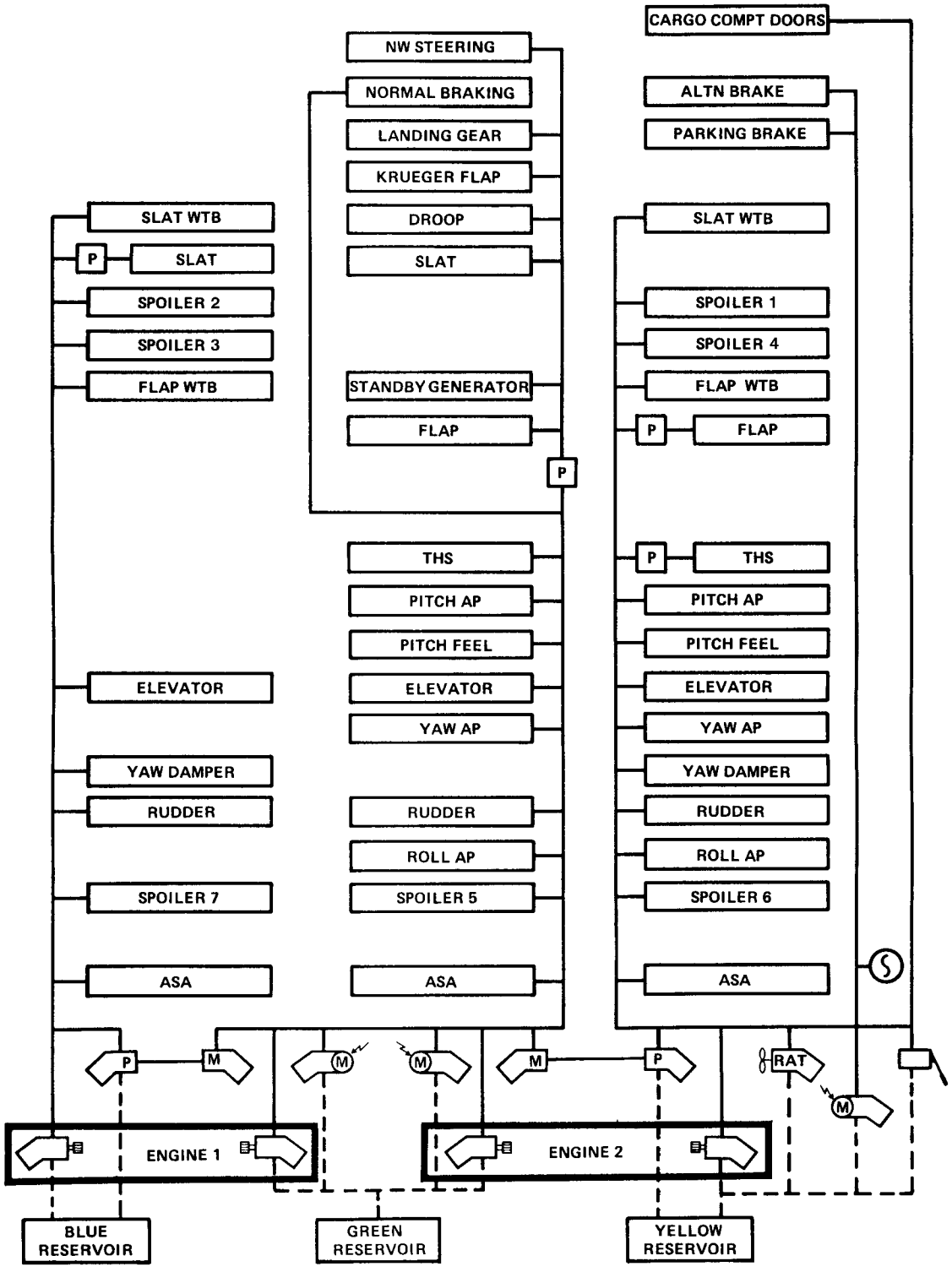
The aircraft is provided with three independent hydraulic systems identified by the colors Green, Blue and Yellow, between which the users are shared in order to ensure aircraft control in the event of loss of two systems or two engines.
The three main systems each include a reservoir and are pressurized to

INTENTIONALLY BLANK



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Hydraulic Power
Figure 002



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Hydraulic Power Users
Figure 003

R

3000 psi by four identical variable displacement pumps driven by the engine accessory gearboxes. There is one Green system pump on each engine, the Blue system pump is on the L engine and the Yellow system pump is on the R engine.

The three auxiliary systems include :

- Green system : two electric pumps, mainly used on the ground for maintenance and check list purposes.
- Blue system : a power transfer unit driven by the Green system used in the event of failure of the L engine, or on the ground.
- Yellow system : a power transfer unit - same as the Blue system;
  a pump driven by a ram air turbine used in the event of failure of both engines;
  an electric pump pressurizing the brake Yellow power accumulator and allowing cargo compartment door operation on the ground ;
  a hand pump for emergency operation of the cargo compartment doors.

(Ref. Fig. 002, 003) show the allocation of the pumps and users to the three systems. The location of the pumps on the aircraft is shown (Ref. Fig. 003) with a diagram of the main hydraulic line runs.

The following points should be noted as far as segregation is concerned :

- The reservoirs are separated from one another,
- Blue system components are located next to the reservoir in order to avoid having Blue system line runs in the landing gear well,
- The number of Yellow system components and the width of the pipes in this well are limited,
- The Yellow and Green system line runs are separated in the forward fuselage and the Blue, Green and Yellow system line runs are separated in the aft fuselage.
- Parallel line runs of the three systems to the five essential control surfaces and to lesser exposed areas such as parts of the wing and horizontal stabilizer box rear spars are limited to the strict minimum.

Isolation is mainly achieved by the following components in each of the three systems :

- The engine pump fire valve, which closes off the suction line and limits the propagation of fires.
- The servo controls selector valve, which cuts off the high pressure supply and connects it to the reservoir return.
  It is used in the event of jamming or leakage or during ground tests.

B. Layout - General Installation Requirements
(Ref. Fig. 004)
(Ref. Fig. 005)
(Ref. Fig. 006)
(Ref. Fig. 007)

(1) Location of the line runs and components of each system has been determined using the following criterion as a basis as far as possible : in the various zones exposed to projection of various objects from the ground or from the aircraft (burst tires, wheels, compressor or turbine blades) the three systems will be separated in such a way that two systems at the most may be affected at the same time.
This criterion leads to the following hydraulic component and pipe locations :
- in the fuselage center section (main landing gear well) only the Green and Yellow systems are present,
- the Blue system, of which most of the components are located in the triangular bay in the L wing (outboard of the fuselage) is always routed outboard of the fuselage center section.

In zones not exposed to projections from the ground (fuselage aft of FR54 and forward of FR47) the hydraulic line runs of the three systems are separated so that at least one system is not affected by any turbine or compressor disc burst.

(2) In flight, unused systems (landing gear, nose wheel steering, cargo compartment doors, braking) are isolated.

(3) A hydraulic safety valve is installed on the supply line to the rudder Green system servo control in order to prevent loss of this system in the event of an inflight collision.

(4) The stainless steel high pressure lines are electrically bonded by means of bonding braid and clips. Painted light alloy low pressure lines are excellent conductors, and are not therefore bonded.

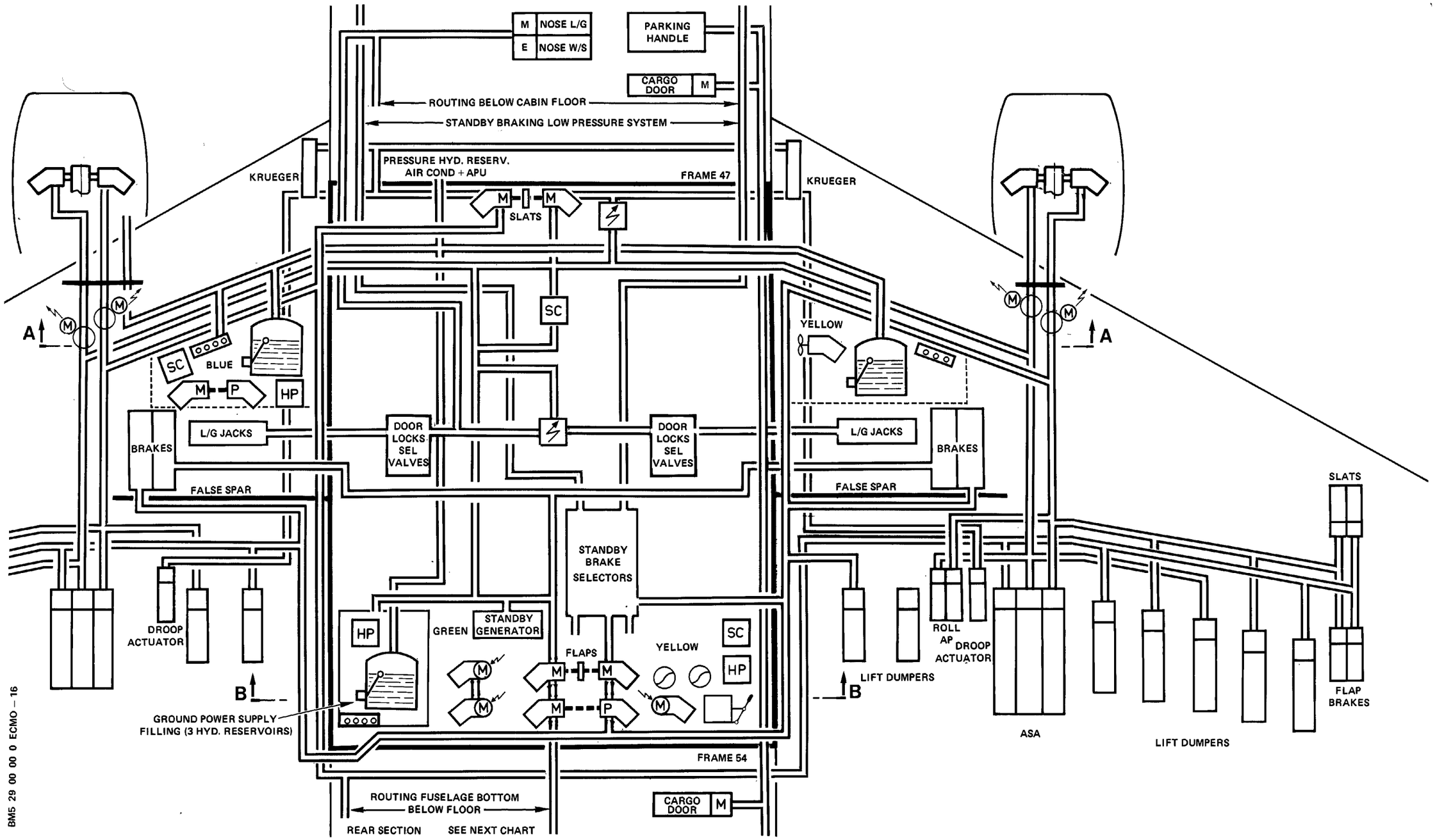
(5) Relative movement between hydraulic components and the structure or between two structural zones will be absorbed by flexible hoses or swivel joints.
In particular, hydraulic motors and pumps are connected to the system by flexible hoses, except for yellow electric pump (cargo compartment doors and brake accumulator charging).

(6) All precautions will be taken to avoid system mismatching at lines and components (different lengths of flexible hose or different diameter fittings).

(7) All lines will be corrosion protected. High pressure lines are made of unpainted 21-6-9 stainless steel and low pressure lines are made of painted 6061 T6 light alloy.

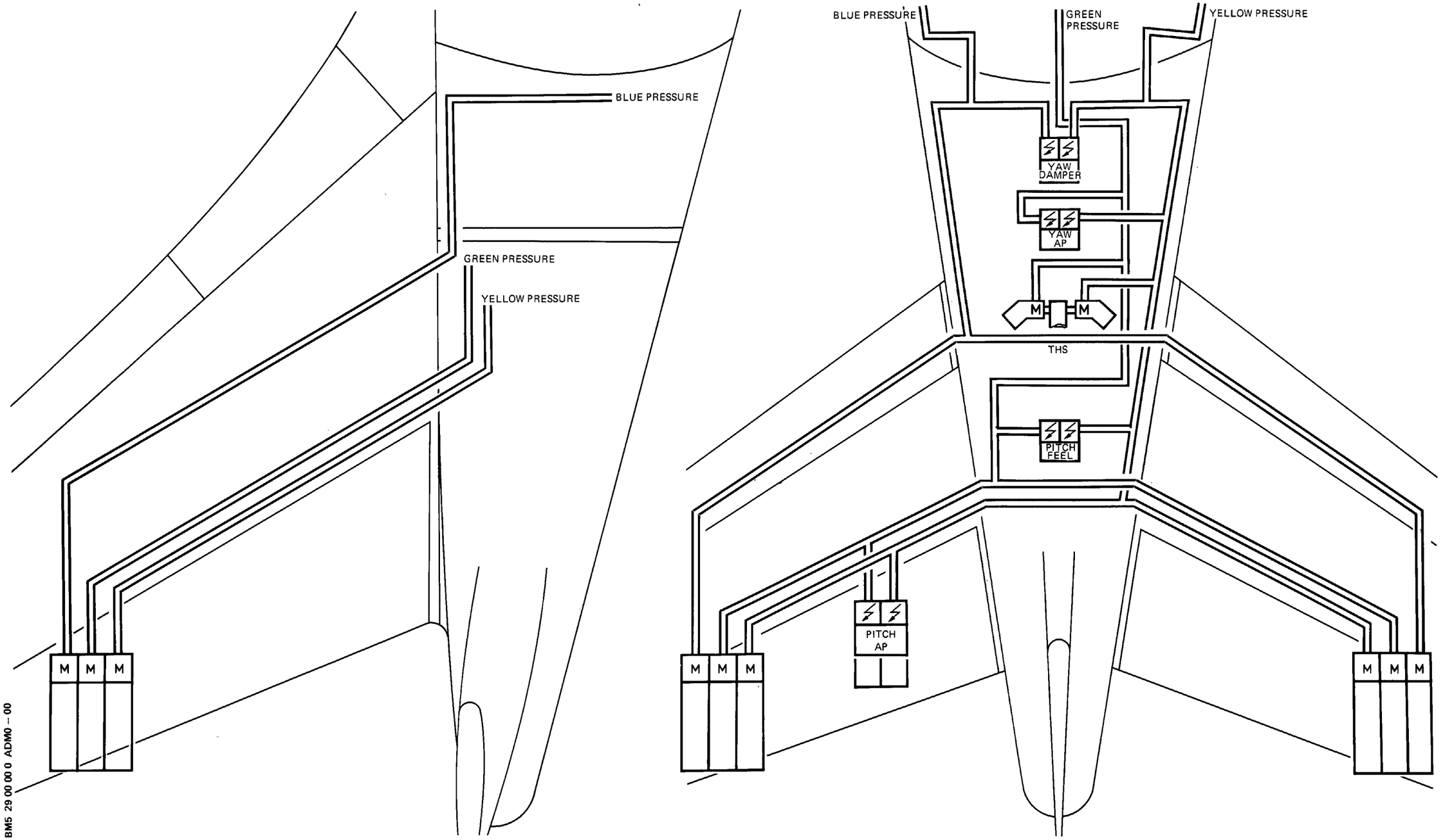
(8) There are no hydraulic lines runs in the passenger compartment or flight compartment and all precautions have been taken in order to avoid air conditioning system contamination by hydraulic fluid or vapors.

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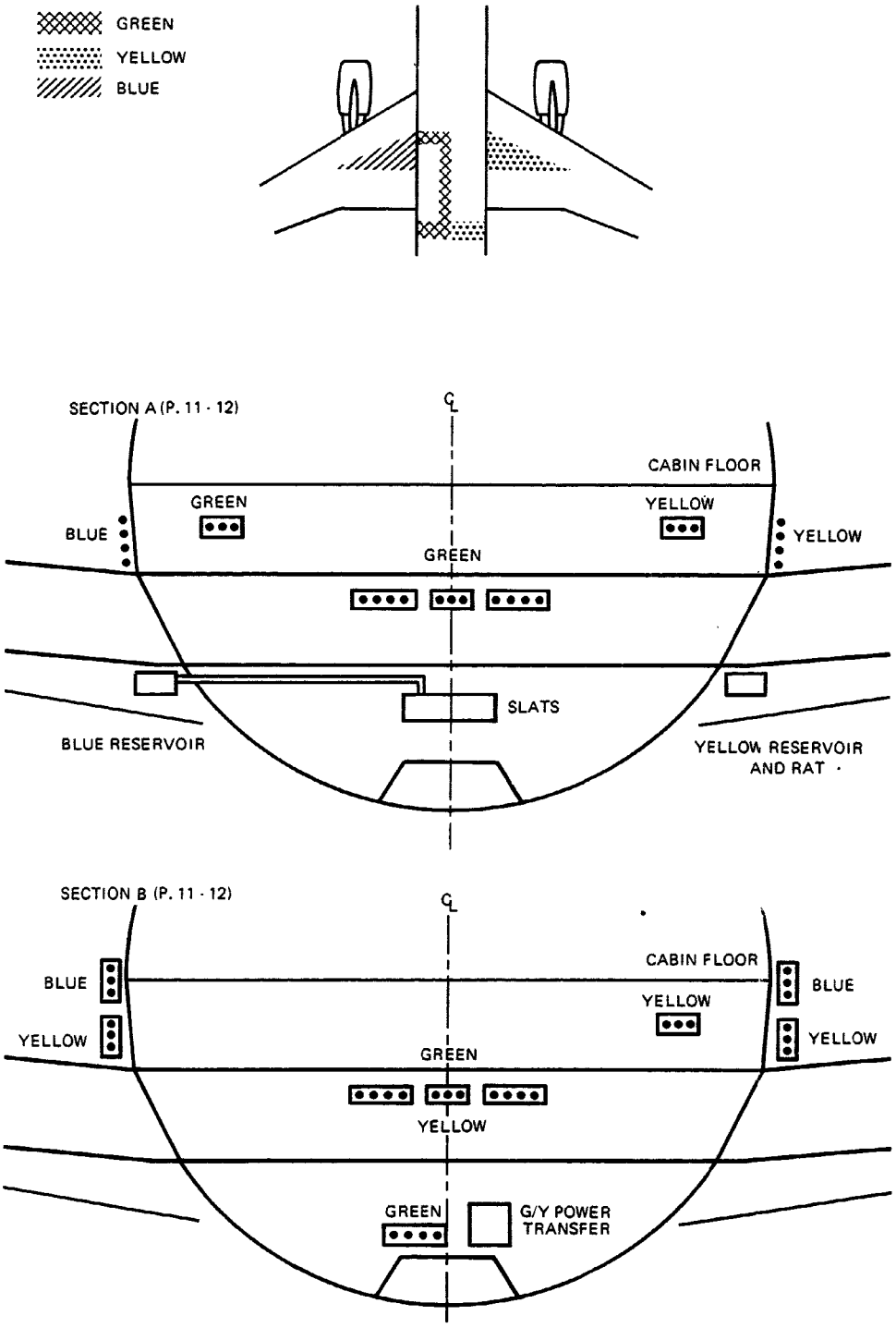


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Main Component Location and Line Routing
Figure 004

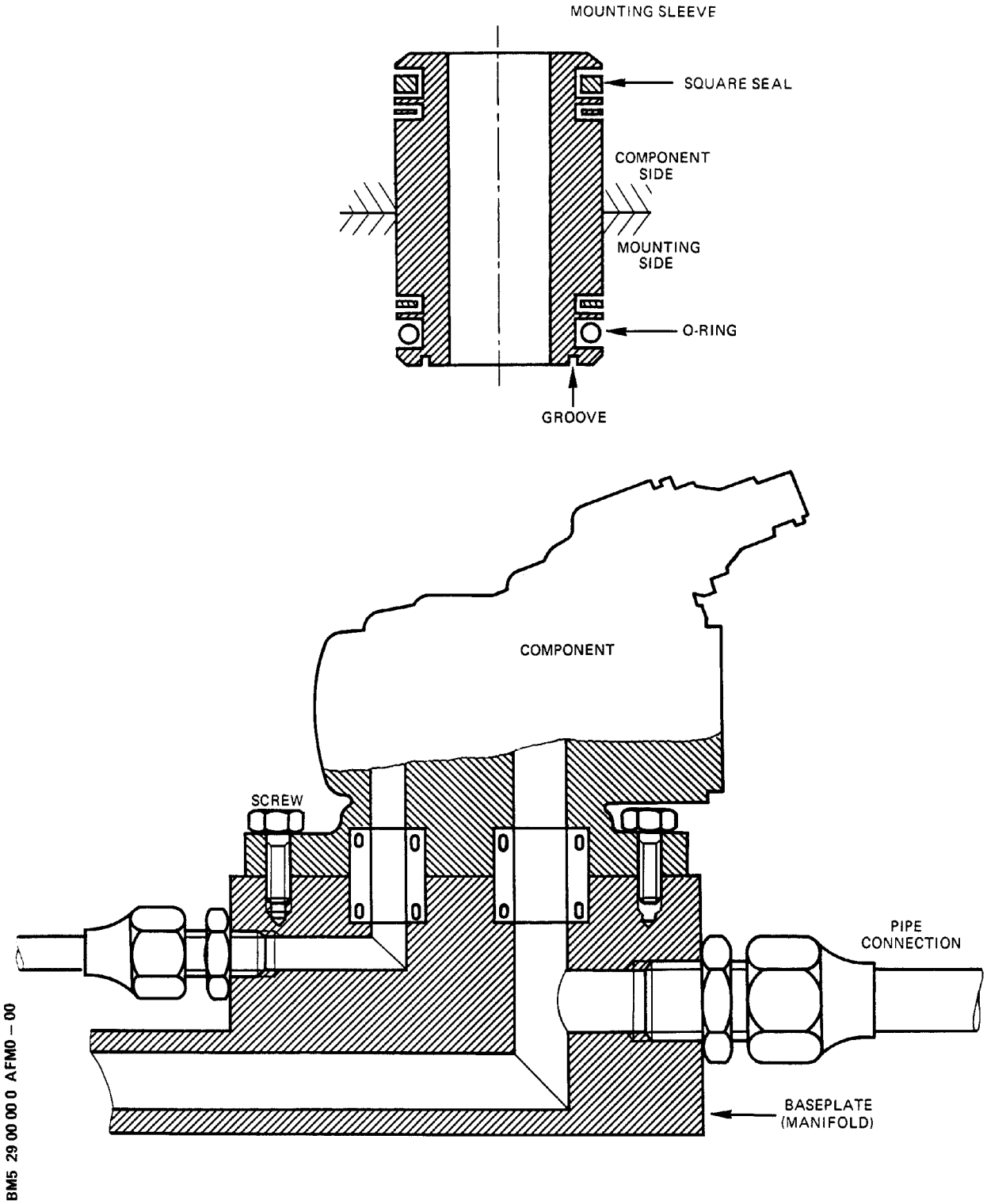


Line Routing
Figure 005



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Line Routing
Figure 006



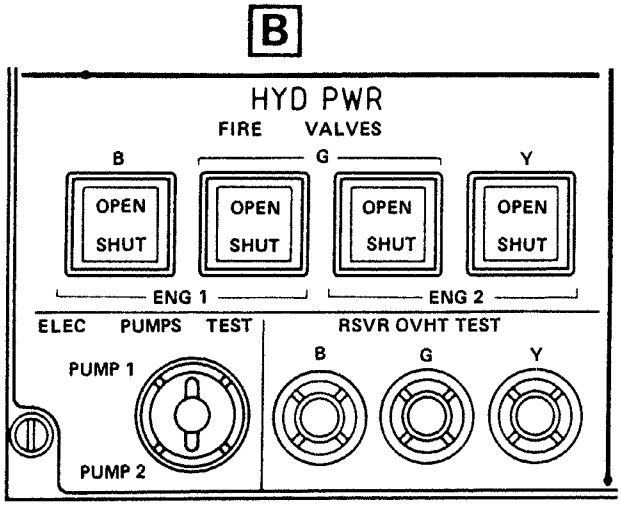
Bobbin Connection Type
Figure 007

(9)Use on the pressure and return systems of manifolds on which a maximum number of components are installed by means of sealing bobbins and mounts (filters, pressure relief valves, priority valves, pressure switches, electrovalves...) ensures longer life of the pipes and fittings (which are not handled when components are removed), limits the risk of leakage and facilitates maintenance.
(Ref. Fig. 007) for component-to-mounting connection principle by means of a bobbin.
The bobbins are equipped with one square seal on component side and one O-ring on mounting side. An identification groove is provided for fool proofing. Whenever a component is removed, the bobbin is held in the component by the square seal. If the component is not immediately re-installed, the open port can be easily blanked off by means of a plug/cap.
NOTE : Some other manifolds may be equipped with symmetrical bobbins with same O-ring on both sides and can therefore be installed either way round.

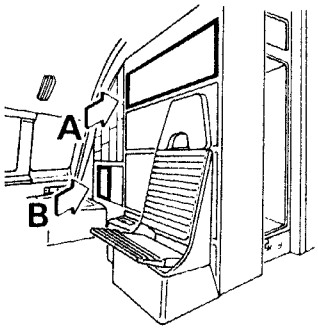
(10)Any hydraulic fluid leakage is collected and drained overboard to avoid any accumulation, thus limiting the risk of fire.

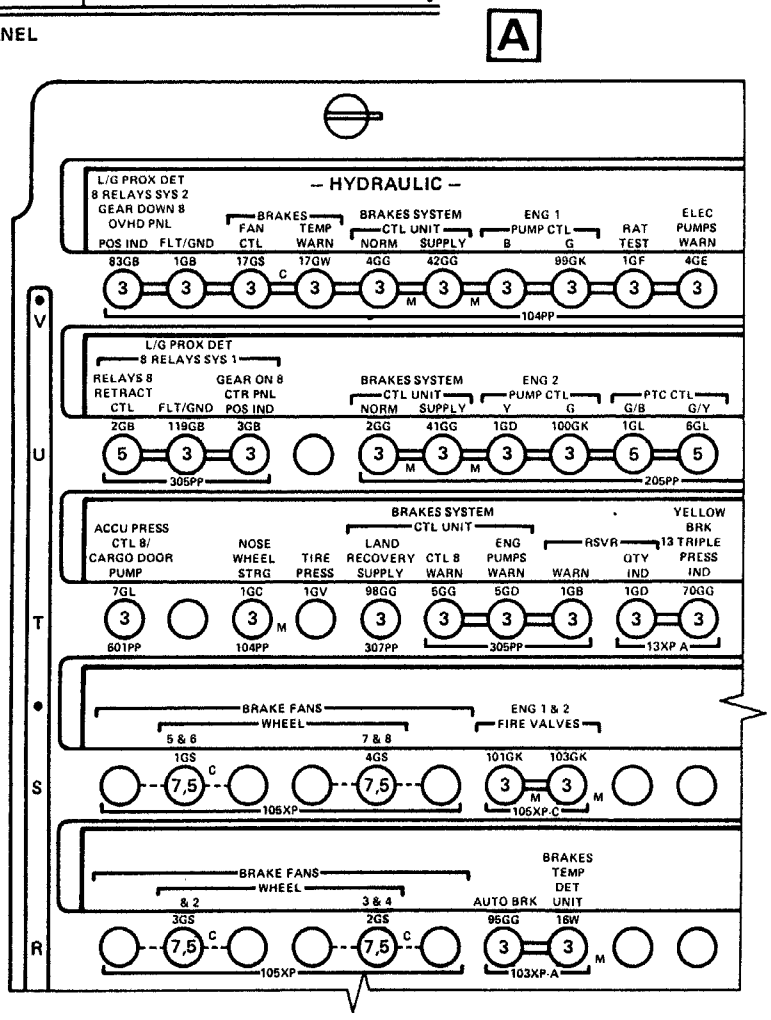
3. Flight Compartment Controls and Indicators - Electrical Power Supply - Warnings
(Ref. Fig. 008)
(Ref. Fig. 009)
(Ref. Fig. 010)

A. General
- The flight compartment controls and indicators are shown
  Main control panel layout follows the general schematic layout of the hydraulic system.
- Each engine pump, each power transfer unit, and the pair of Green system electric pumps are controlled by pushbutton switches (a total of seven) providing :
  . illuminated display of positions that are abnormal in cruise,
  . the indication supplied by the associated pressure switch (Green system electric and engine pumps).
- The fire valves isolating the engine pumps from the suction lines are operated by the engine fire handles. An annunciator is provided for each valve on the maintenance panel to indicate that it is OPEN or SHUT.
- A three-position switch on the same panel allows the two Green system electric pumps to be tested separately. Maintenance panel annunciator lights are in general turned off in flight (ANN LTS switch on panel 473VU in OFF position).
- The Yellow system electric pump which allows cargo compartment door operation on the ground and brake Yellow power accumulator charging is operated by holding the pushbutton switch on the center instrument panel pressed.
  A brake Yellow pressure triple indicator to the left of this pushbutton switch provides a reading of the accumulator pressure on its center dial.
- The ram air turbine (RAT) is mechanically controlled by cables, by means of either one of two levers on the side consoles in the flight compartment.



MAINTENANCE PANEL



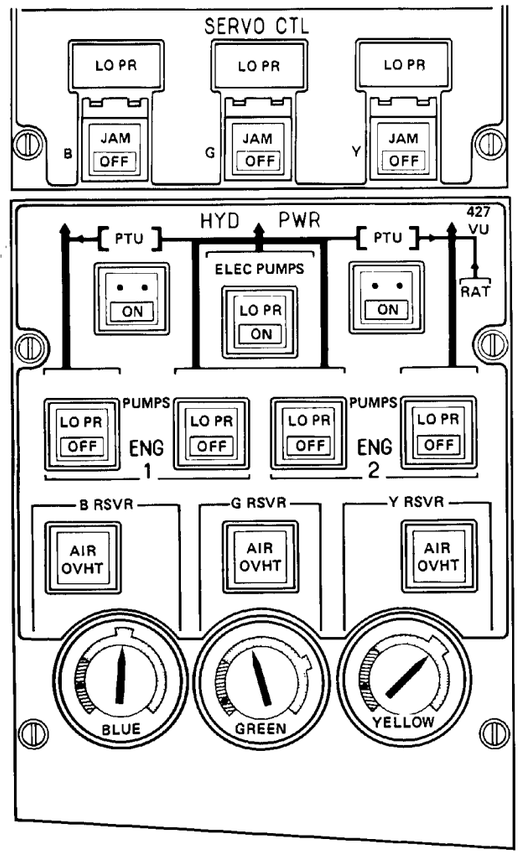


MAINTENANCE AND CIRCUIT BREAKER PANELS

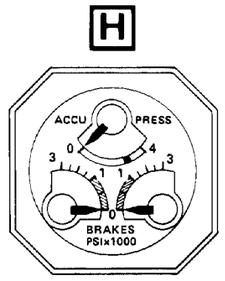
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Hydraulic Power - Flight Compartment Controls and Indications
(Maintenance and Circuit Breaker Panels)
Figure 008

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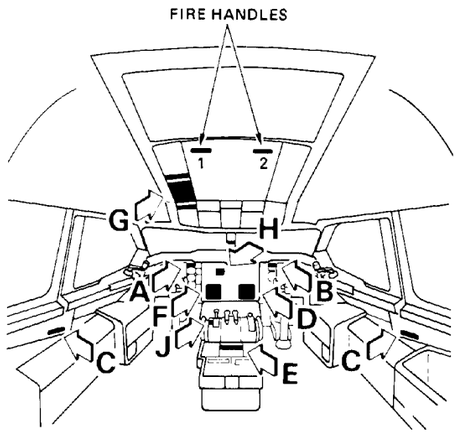
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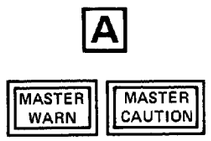


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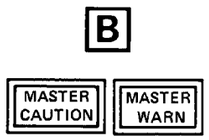


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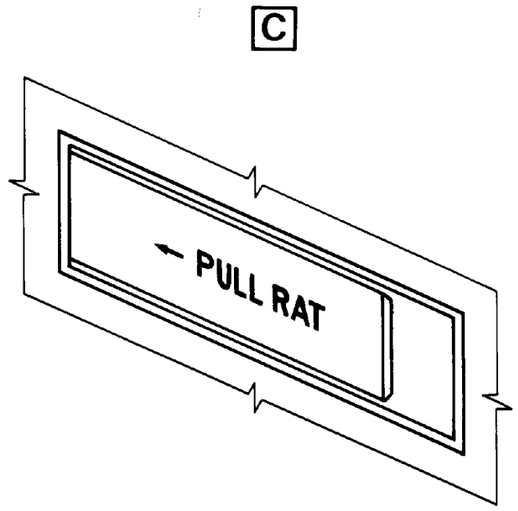




A

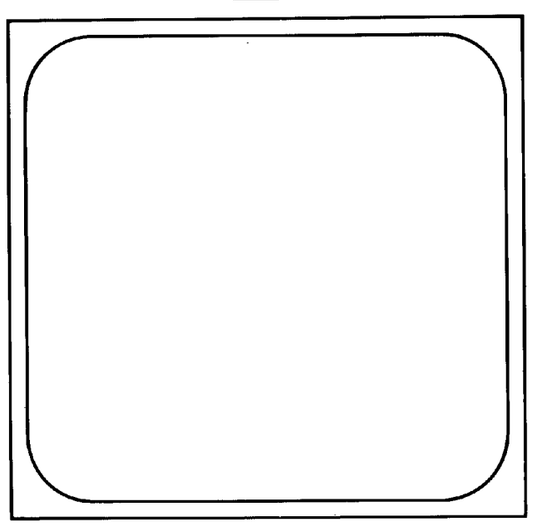


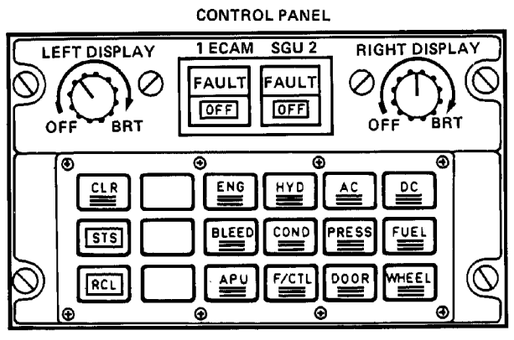
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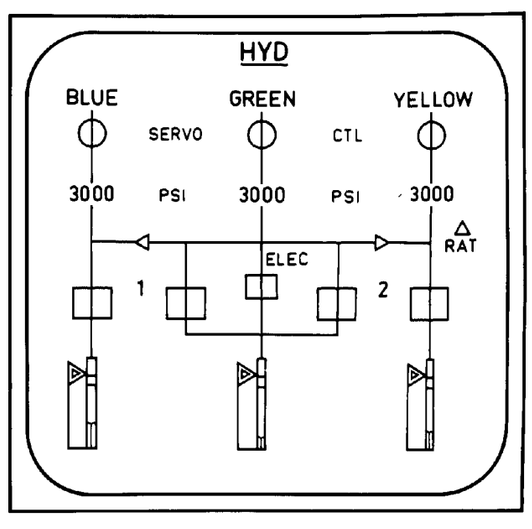
C

F





E



D

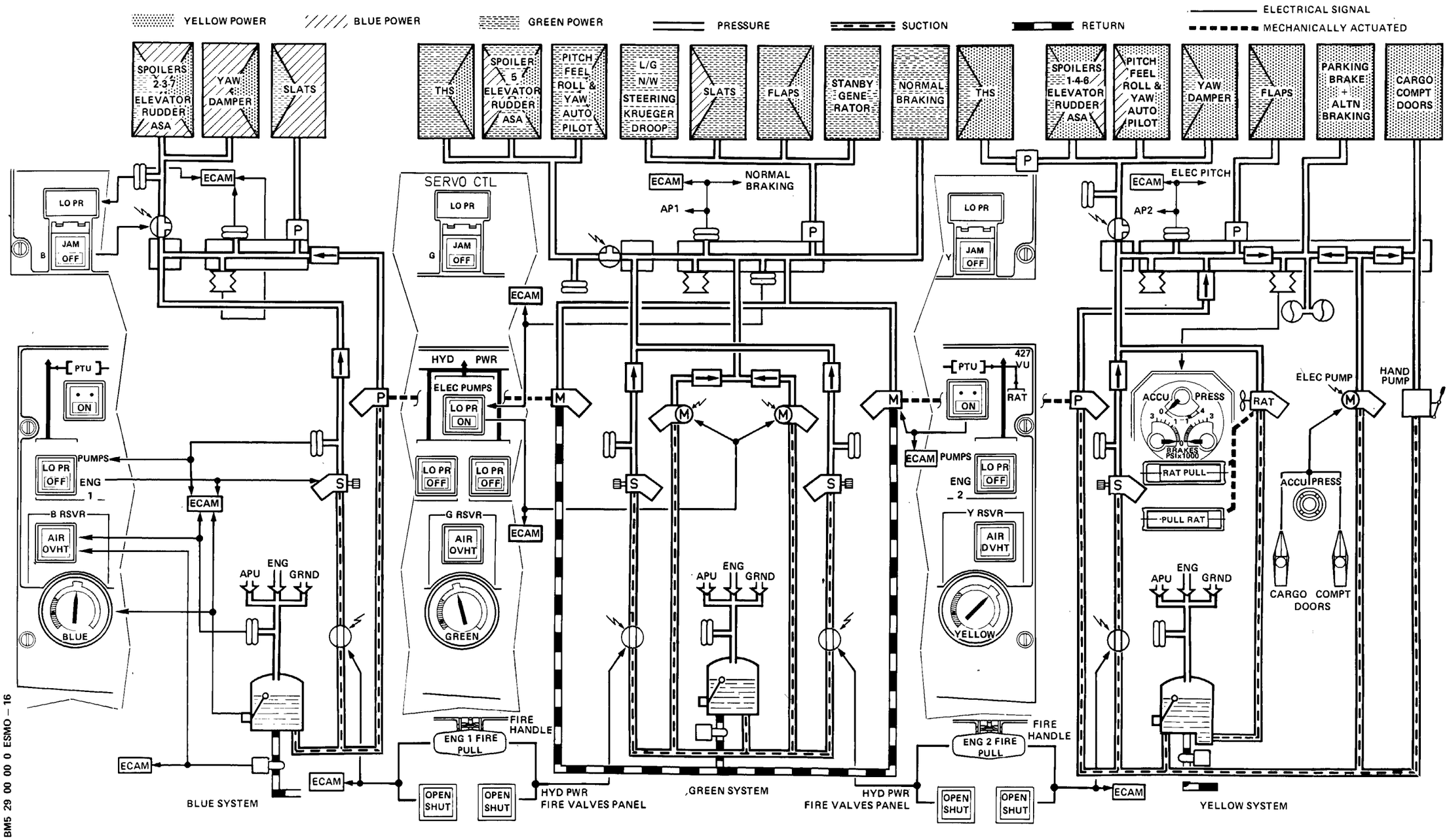
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Hydraulic Power - Flight Compartment Controls and Indications
(Control Panels)
Figure 009

EFFECTIVITY: ALL

PIA

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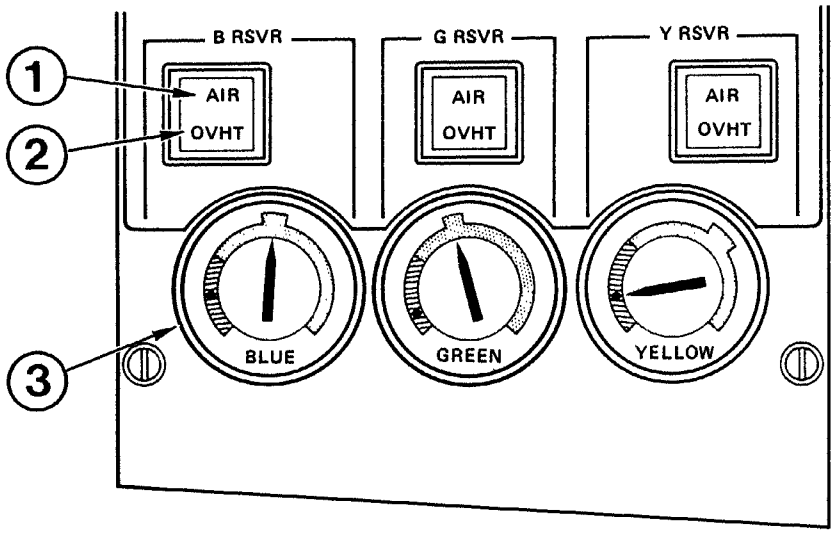
Hydraulic Power - General Schematic
Figure 010

B. Controls and Indications - HYD PWR Overhead Panel
(Ref. Fig. 011)
R (Ref. Fig. 012)

C. Indications - ECAM Display - HYD Panel
(Ref. Fig. 013)
(Ref. Fig. 014)
(Ref. Fig. 015)

D. ACCU PRESS Controls and Hyd Ram Air Turbine Handles
(Ref. Fig. 016)

E. Controls and Indications - HYD PWR Panel (Rear Panel)
(Ref. Fig. 017)



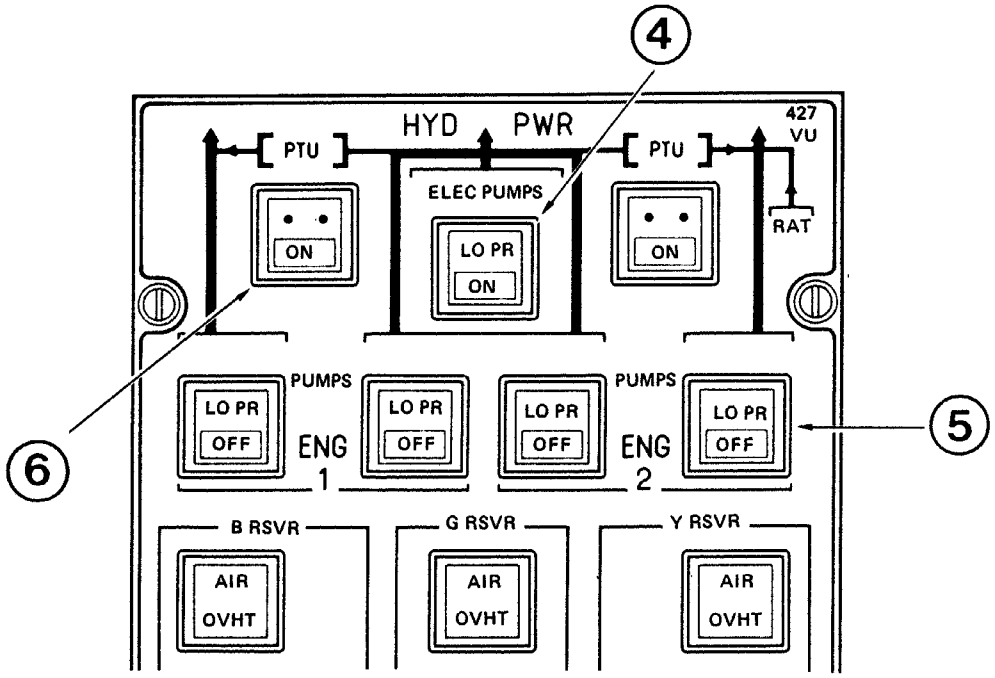
-1- AIR LIGHT
IN NORMAL CONFIGURATION, THE AIR LIGHT IS OFF, AND THE LEGEND IS NOT VISIBLE. THE LEGEND COMES ON AMBER WHEN RESERVOIR AIR PRESSURE IS BELOW 22 PSI. IT IS ACCOMPANIED BY MASTER CAUTION LIGHTS ON CAPT AND F/O MAIN INSTRUMENT PANELS 3VU AND 5VU WITH ASSOCIATED SC AND ECAM ACTIVATION.

-2- OVHT LIGHT
IN NORMAL CONFIGURATION, THE OVHT LIGHT IS OFF, AND THE LEGEND IS NOT VISIBLE. THE LEGEND COMES ON AMBER WHEN RESERVOIR FLUID (TEMPERATURE REACHES 95°C ± 5°) IT IS ACCOMPANIED BY MASTER CAUTION LIGHTS ON CAPT AND F/O MAIN INSTRUMENT PANELS 3VU AND 5VU WITH ASSOCIATED SC AND ECAM ACTIVATION.

-3- RESERVOIR HYDRAULIC QUANTITY INDICATORS
INDICATE THE FLUID LEVEL IN THE RESPECTIVE HYDRAULIC RESERVOIR. IF ON INDICATOR IS NOT ELECTRICALLY SUPPLIED, THE POINTER MAY MOVE TO ANY POSITION WITHOUT ANY WARNING.
– GREEN ARC : NORMAL USABLE RANGE OF HYDRAULIC FLUID.
– UPPER SMALL GREEN ARC :
ON GROUND WITH RESERVOIR PNEUMATICALLY PRESSURIZED AND HYDRAULIC SYSTEM DEPRESSURIZED.
•POINTER WITHIN UPPER SMALL GREEN ARC INDICATES NORMAL FLUID LEVEL IN RESERVOIR.
•POINTER AT MAX. LIMIT OF UPPER SMALL GREEN ARC INDICATES MAX. NORMAL FLUID LEVEL IN RESERVOIR.
•POINTER AT MIN. LIMIT OF UPPER SMALL GREEN ARC INDICATES MIN. NORMAL FLUID LEVEL IN RESERVOIR.
IN CASE OF EXTREME OAT :
• FOR OAT BELOW -10°C, THE POINTER MAY BE BELOW THE UPPER SMALL GREEN ARC DOWN TO TWO NEEDLES WIDTH.
• FOR OAT ABOVE 20°C, POINTER MAY BE ABOVE THE UPPER SMALL GREEN ARC UP TO TWO NEEDLES WIDTH.
– YELLOW ARC WITH RED DOT :
POINTER WITHIN YELLOW ARC INDICATES ABNORMAL FLUID LEVEL IN RESERVOIR. WHEN POINTER DROPS TO AR BELOW THE RED DOT, ECAM SYSTEM MASTER CAUTION LIGHTS ON CAPT AND F/O MAIN INSTRUMENT PANELS 3VU AND 5VU AND ASSOCIATED SC ARE ACTIVATED.

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HYD PWR Overhead Panel (1 of 2)
R Figure 011



4 - ELEC PUMPS PUSHBUTTON SWITCH
IN NORMAL CONFIGURATION, THE PUSHBUTTON SWITCH LEGENDS ARE OFF AND THE ELECTRIC PUMPS ARE DE-ENERGIZED.
WHEN THE SWITCH IS PRESSED :
- IN NORMAL CONFIGURATION, THE ELECTRIC PUMPS ARE ACTIVATED, THE ON LEGEND IN THE LOWER HALF OF THE SWITCH COMES ON WHITE.
- IF BOTH ELECTRIC PUMPS ARE FAILED, THE LO PR LEGEND IN THE UPPER HALF OF THE SWITCH COMES ON AMBER. IT IS ACCOMPANIED BY MASTER CAUTION LIGHTS ON CAPT AND F/O MAIN INSTRUMENT PANELS 3VU AND 5VU WITH ASSOCIATED SC AND ECAM ACTIVATION.
- IN THE EVENT OF 28VDC POWER SUPPLY LOSS, ELEC PUMPS PUSHBUTTON SWITCH RETURNS TO THE RELEASED POSITION.

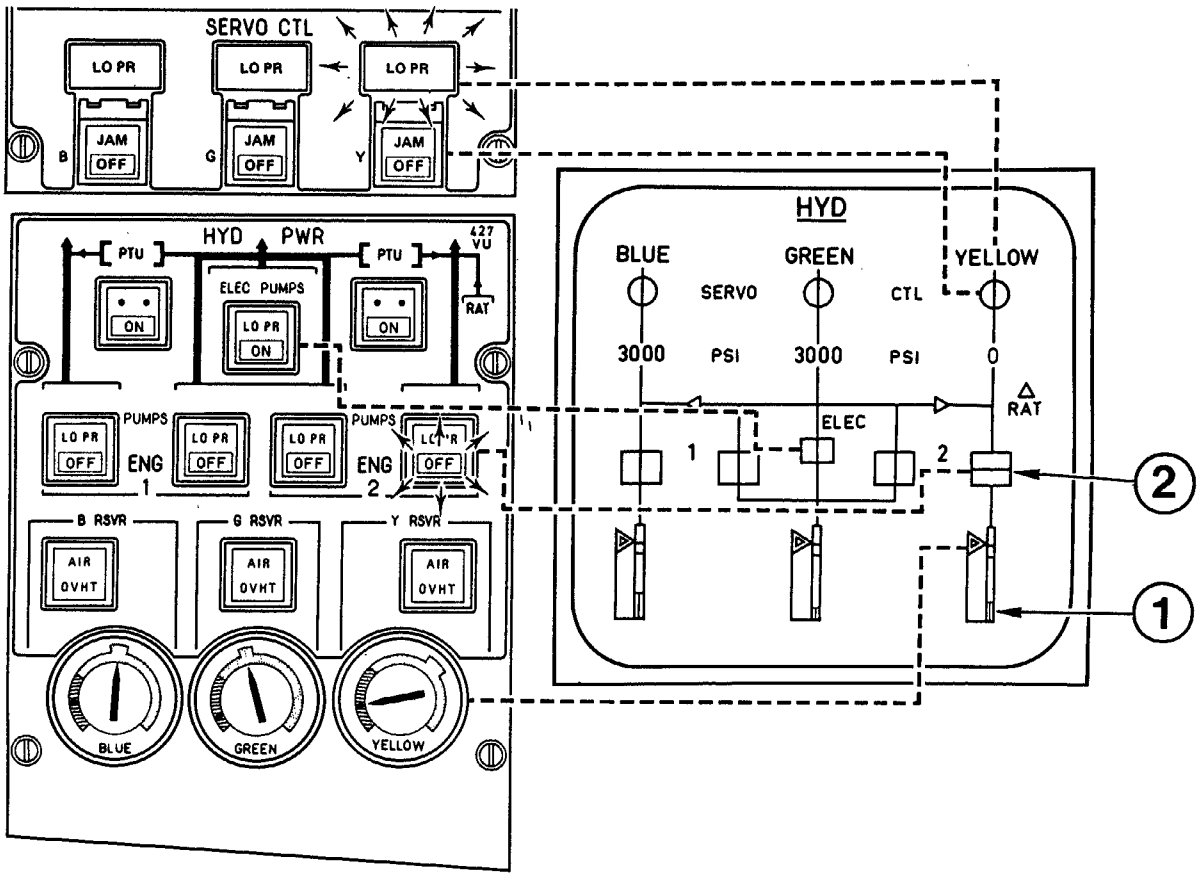
5 - PUMPS/ENG 1, B AND G, ENG 2, G AND Y PUSHBUTTON SWITCHES
IN NORMAL CONFIGURATION, IN FLIGHT, THE SWITCH IS PRESSED (IN), AND THE LEGENDS ARE OFF.
IF PUMP DELIVERY PRESSURE DROPS BELOW 1810 PSI, THE LO PR LEGEND IN THE UPPER HALF OF THE SWITCH COMES ON AMBER. IT IS ACCOMPANIED BY MASTER CAUTION LIGHTS ON CAPT AND F/O MAIN INSTRUMENT PANELS 3VU AND 5VU WITH ASSOCIATED SC AND ECAM ACTIVATION. IF THE SWITCH IS RELEASED (OUT), THE PUMP IS DE-ENERGIZED AND THE OFF LEGEND IN THE LOWER HALF OF THE SWITCH COMES ON WHITE. IT IS ACCOMPANIED BY MASTER CAUTION LIGHTS ON CAPT AND F/O MAIN INSTRUMENT PANELS 3VU AND 5VU WITH ASSOCIATED SC AND ECAM ACTIVATION.

6 - PTU PUSHBUTTON SWITCHES
EACH POWER TRANSFER UNIT (PTU), GREEN/YELLOW AND GREEN/BLUE, IS CONTROLLED BY A PUSHBUTTON SWITCH.
WHEN THE SWITCH IS PRESSED (IN), THE PTU IS ACTIVATED, AND THE ON LEGEND IN THE LOWER HALF OF THE SWITCH COMES ON WHITE
WHEN THE SWITCH IS RELEASED (OUT), THE PTU IS DEACTIVATED AND THE ON LEGEND GOES OFF.

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HYD PWR Overhead Panel (2 of 2)
Figure 012

R



(1) RESERVOIR LEVEL INDICATION :

	BLUE	GREEN	YELLOW
FULL LEVEL	15 L	31 L	23 L
NORMAL FILLING	10–12 L	15–17	16.5–18.5
LO LEVEL WARNING	⩽ 5 L ± 0.5	⩽ 5 L ± 0.5	⩽ 5 L ± 0.5

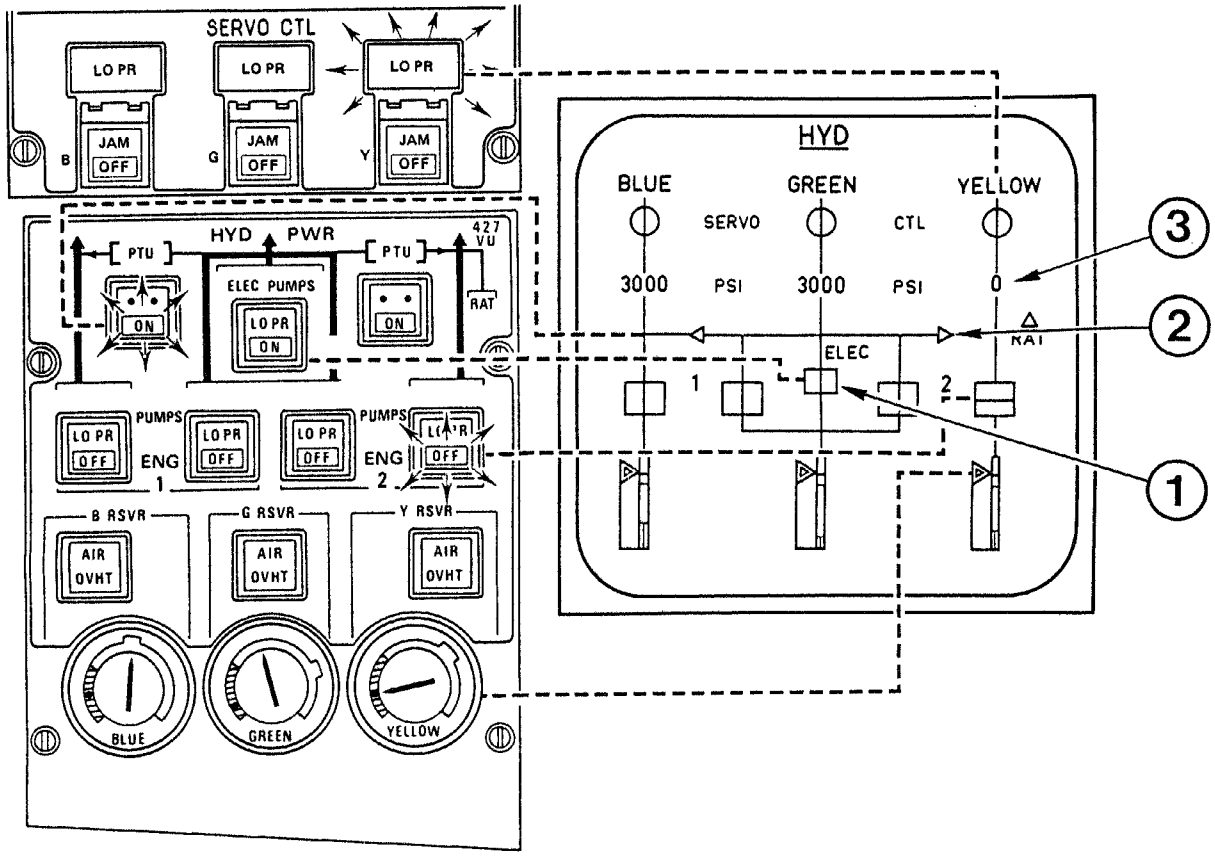
THE LOWER PART OF THE RESERVOIR LEVEL INDICATION AND THE TRIANGLE BECOME AMBER WHEN THE FLUID LEVEL IS LOWER OR EQUAL TO 5 L.

(2) ENGINE PUMP CONTROL AND LOW PRESSURE INDICATIONS

	GREEN	THE PUMP IS SELECTED ON AND : FLUID PRESSURE > 2200 PSI (IF PRESSURE IS INCREASING) OR THE FLUID PRESSURE > 1800 PSI (IF PRESSURE IS DECREASING)
LO	AMBER	THE PUMP IS SELECTED ON AND : FLUID PRESSURE < 2200 PSI (IF PRESSURE IS INCREASING) OR FLUID PRESSURE < 1800 PSI (IF PRESSURE IS DECREASING)
	AMBER	THE PUMP IS SELECTED OFF

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Reservoir Level Indication
Figure 013



(1) ELECTRIC PUMPS CONTROL AND LOW PRESSURE INDICATIONS :

	GREEN	THE PUMPS ARE SELECTED OFF
	GREEN	THE PUMPS ARE SELECTED ON AND : FLUID PRESSURE > 1740 PSI (IF PRESSURE IS INCREASING) OR FLUID PRESSURE > 1450 PSI (IF PRESSURE IS DECREASING)
LO	AMBER	THE PUMPS ARE SELECTED ON AND : FLUID PRESSURE < 1740 PSI (IF PRESSURE IS INCREASING) OR FLUID PRESSURE < 1450 PSI (IF PRESSURE IS DECREASING)

(2) POWER TRANSFER UNIT CONTROL

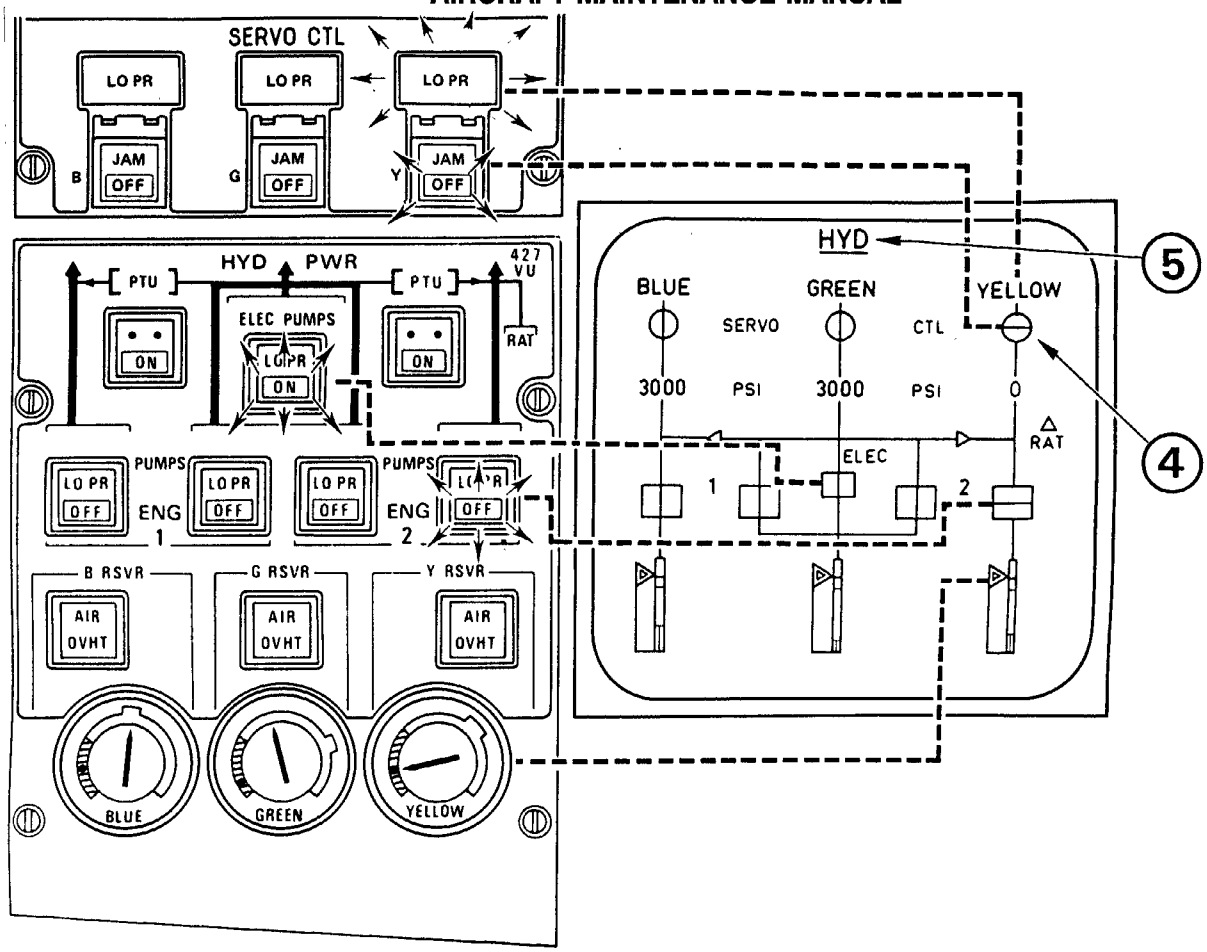
ON THE FIGURE : THE GREEN/BLUE PTU IS SELECTED ON
THE GREEN/YELLOW PTU IS SELECTED OFF

(3) HIGH PRESSURE MANIFOLD INDICATION :

THE PRESSURE INDICATIONS BECOMES AMBER WHEN PRESSURE ≤ 1450 PSI
NOTE : A FIXED WHITE RAT INDICATION IS DISPLAYED.

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Electric Pumps Control and Low Pressure Indications
Figure 014



(4) SERVO CTL SELECTOR VALVES POSITION INDICATION :

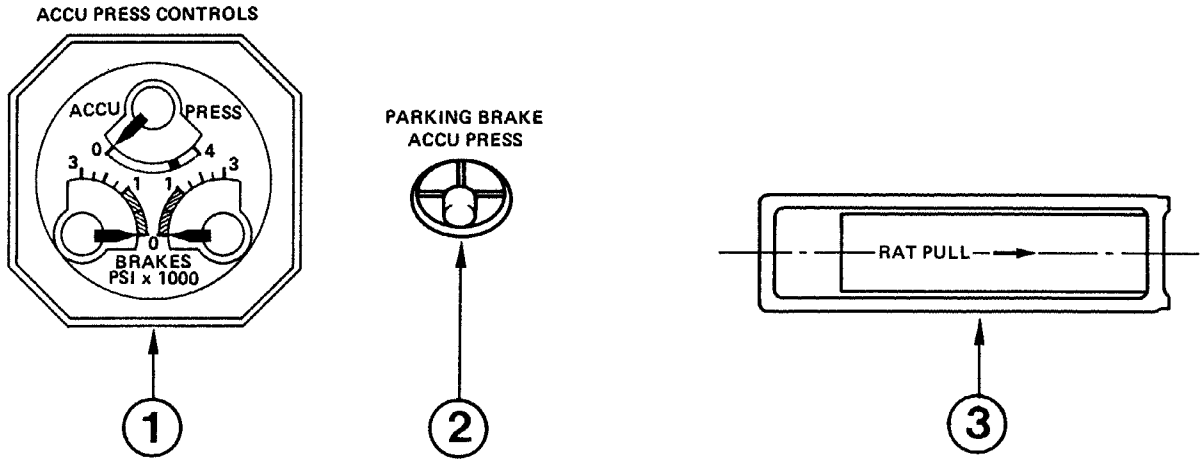
	GREEN	SERVO CTL VALVE IS SELECTED OPEN AND PRESSURE >1450 PSI
		WHEN 3 SERVO CTL VALVE ARE SELECTED OFF
	AMBER	SERVO CTL VALVE IS SELECTED OPEN AND PRESSURE< 1450 PSI
	AMBER	WHEN THE ASSOCIATED SERVO CTL VALVE IS SELECTED OFF AND AT LEAST ONE OF THE TWO OTHER VALVES OPEN

(5) HYD INDICATION :

THE HYD INDICATION IS WHITE WHEN THE HYD DISPLAY HAS BEEN CALLED MANUALLY
THE HYD INDICATION IS AMBER WHEN THE HYD PAGE IS DISPLAYED AUTOMATICALLY FOLLOWING A WARNING.

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Servo Controls Selector Valves Position Indications
Figure 015



-1- ACCU PRESS INDICATOR
INDICATES PRESSURE OF THE TWO BRAKE ACCUMULATORS IN THE YELLOW SYSTEM, AVAILABLE FOR ALTN/OFF AND FOR PARKING BRAKING. PRESSURE INDICATION IS IN PSI X 1000 : SUFFICIENT PRESSURE FOR PARKING BRAKING IS MAINTAINED BY THE ACCUMULATOR FOR APPROX. 12 H (THE INDICATOR ACCUARY IS ± 2% OF THE FULL SCALE).

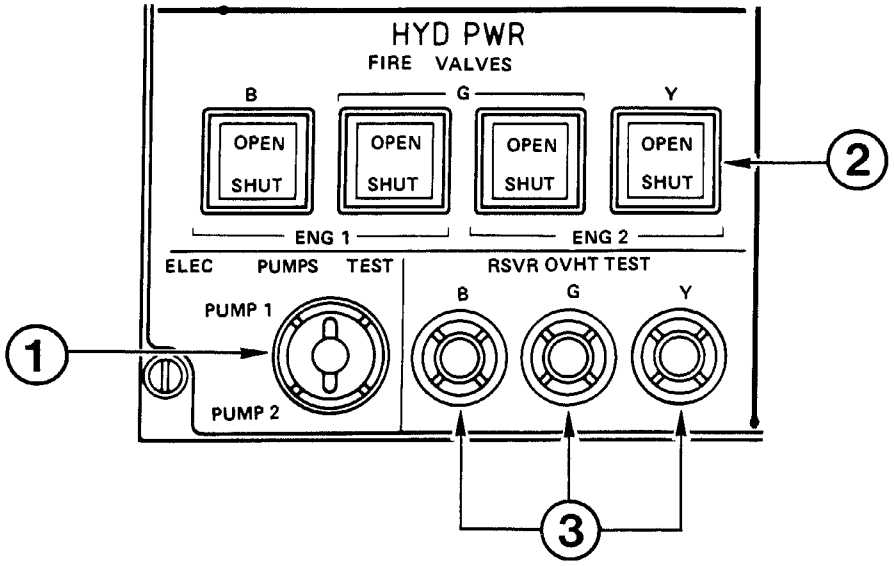
-2- PARKING BRAKE ACCU PRESS PUSHBUTTON SWITCH
LOCATED ON CENTER PEDESTAL, CONTROLS THE ELECTRIC PUMP IN THE YELLOW SYSTEM, TO OPERATE IT FOR RECHARGING OF BRAKE ACCUMULATORS TO 3000 PSI ± 2%.
- PRESSED ELECTRIC PUMP IS ACTIVATED. PRESSURE IS SELF-REGULATED TO 3000 PSI
- RELEASED ELECTRIC PUMP IS DEACTIVATED.

-3- HYD RAM AIR TURBINE HANDLES
THE RAM AIR TURBINE CAN BE EXTENDED BY OPERATION OF EITHER HANDLE, LOCATED ON LH AND RH SIDE CONSOLE.
FOR EXTENSION ONE HANDLE MUST BE RAISED OUT OF THE OFF DETENT, THEN PULLED TO ON.

NOTE : THE RAM AIR TURBINE CAN BE RETRACTED AND RESTOWED ON GROUND ONLY.

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ACCU PRESS Controls and Hyd Ram Air Turbine Handles
Figure 016



- 1 - ELEC PUMPS TEST SWITCH
THE SWITCH CONTROLS THE INDIVIDUAL TEST OF THE ELECTRIC PUMPS IN THE GREEN SYSTEM.
THE SWITCH IS SPRINGLOADED TO NEUTRAL.
FOR TEST, THE ELEC PUMPS PUSHBUTTON SWITCH ON THE HYD PWR SECTION OF THE OVERHEAD PANNEL MUST BE SELECTED ON, THE ON LEGEND ON : LO PR LEGEND OFF.
- PUMP 1 (UNSTABLE) POSITION — PUMP 2 IS DEACTIVATED
PUMP 1 ONLY IS OPERATING
- PUMP 2 (UNSTABLE) POSITION — PUMP 1 IS DEACTIVATED
PUMP 2 ONLY IS OPERATING
- NEUTRAL (STABLE) POSITION — BOTH PUMPS OPERATE
THE TEST OF EACH PUMP IS SUCCESSFUL IF THE LO PR LEGEND IN THE ELEC PUMPS PUSHBUTTON SWITCH DOES NOT COME ON.

- 2 - FIRE VALVES ENG 1, B and G/ENG 2, G AND Y ANNUNCIATORS
WHEN THE ANN LT SWITCH, ON THE REAR PANEL, IS PLACED IN READ, THE FIRE VALVES LEGENDS INDICATE THE POSITION OF THE RESPECTIVE FIRE VALVE WHICH IS CONTROLLED BY THE CORRESPONDING ENG FIRE HANDLE.
- OPEN LEGEND COMES ON WHITE, INDICATING THE VALVE IS FULLY OPEN.
- SHUT LEGEND COMES ON WHITE, INDICATING THE VALVE IS FULLY CLOSED.

- 3 - RSVR OVHT TEST B, G, Y PUSHBUTTON SWITCHES
- PRESSED — AN OVERHEAT SIGNAL IS SIMULATED IN THE CORRESPONDING OVERHEAT DETECTION CIRCUIT.
IF TEST IS SUCCESSFUL, THE RESPECTIVE OVHT LIGHT ON THE HYD PWR SECTION OF THE OVERHEAD PANEL WILL COME ON ACCOMPANIED BY MASTER CAUTION LIGHTS ON CAPT AND F/O MAIN INSTRUMENT PANELS 3VU AND 5VU WITH ASSOCIATED SC AND ECAM ACTIVATION.
- RELEASED — THE OVERHEAT SIGNAL AND THE WARNINGS ARE CANCELLED :

NOTE : THESE PUSHBUTTON SWITCHES ARE ALSO USED FOR THS ACTUATOR JAMMING TEST.

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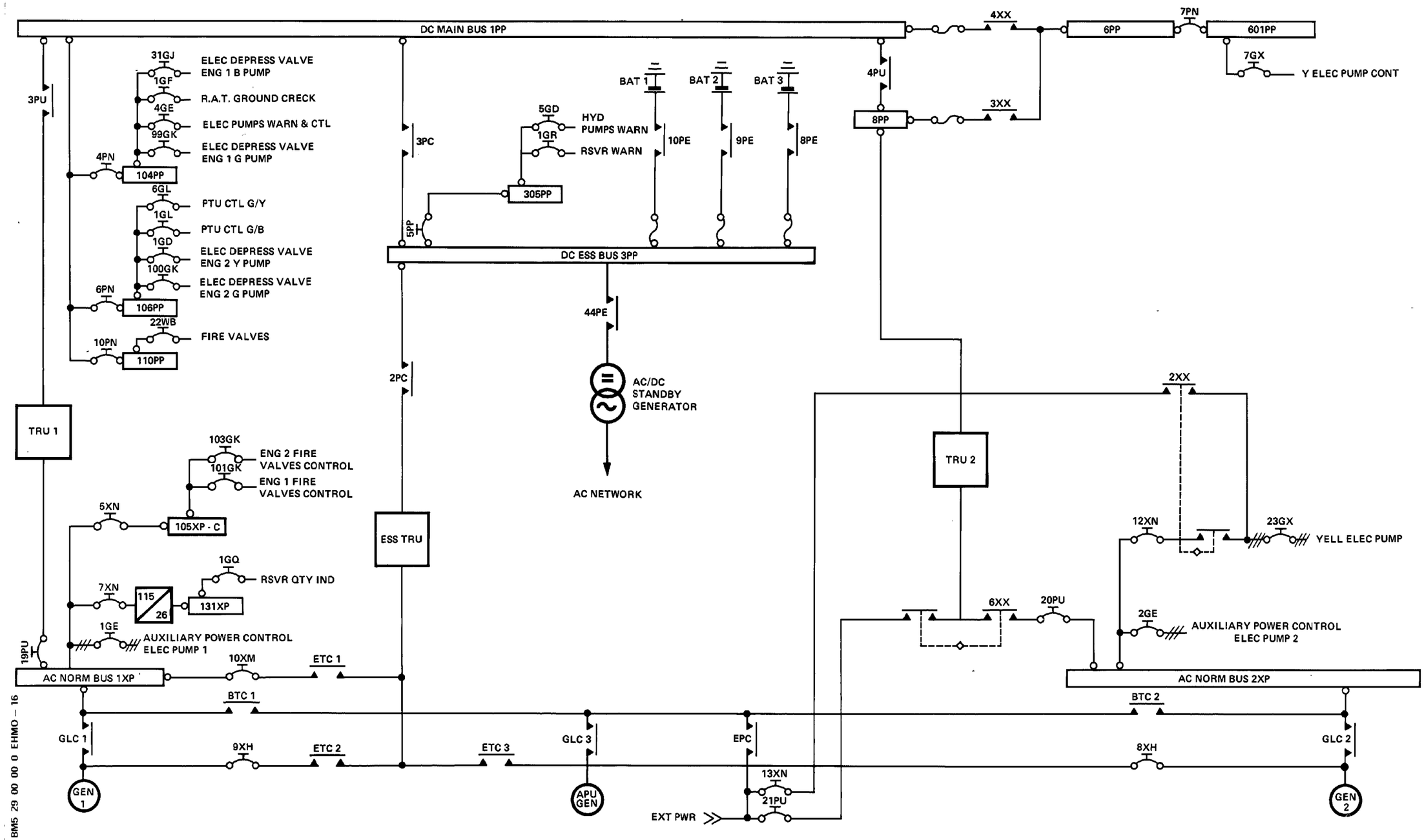
HYD PWR Panel (Rear Panel)
Figure 017

F. Electrical Power Supply
(Ref. Fig. 018)

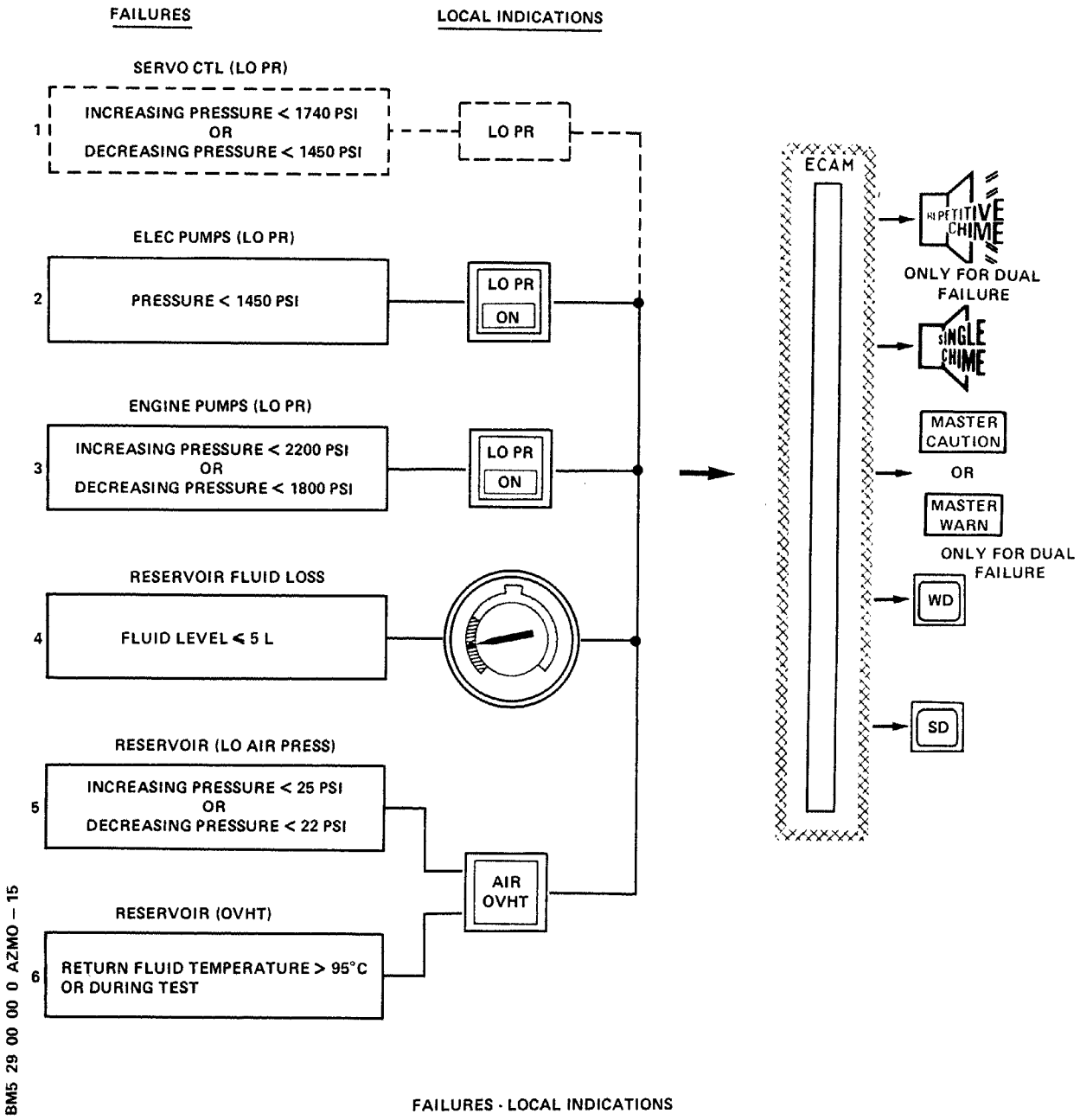
G. Warnings
The warnings consist of :
. Illumination of the amber warning light on the overhead panel if this light is provided.
. Illumination of the **MASTER CAUTION** lights on **CAPT** and **F/O** main instrument panels **3VU** and **5VU**, associated with a single chime. These draw the immediate attention of the crew and require corrective actions.
. Display on the **ECAM** display units of hydraulic system status, corrective actions and effects of the failure.

H. Tests
. Light filament tests are performed by means of switches located in the lower right hand corner of the overhead panel and the lateral panel.
. The electrical channels are partially tested on the ground, periodically, by an appropriate **ECAM** system program.
. Three pushbutton switches are provided on the maintenance panel for testing the overheat detection channels.
(Ref. Fig. 019)

INTENTIONALLY BLANK



Hydraulic System Electrical Power Supply
Figure 018



FAILURES - LOCAL INDICATIONS

Failures - Local Indications
Figure 019

4. Fluid and Pipes

A. Equipment and Materials

ITEM	DESIGNATION
(1)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00, P. Block 1)

Referenced Procedures
- 12-12-00, P. Block 1 Hydraulic Fluids

B. Hydraulic Fluids
(1)General
The hydraulic fluid that may be used is Material No. 02-003, which complies with specification NSA307110.

(2)Main characteristics (Ref. Fig. 020, 021)
The characteristics of new Type IV fluids are as follows :

R

CHARACTERISTICS	SKYDROL 500 B4	SKYDROL LD 4	HYJET IVAPLUS	HYJET V
Viscosity at : - 54° C	2765 cSt	1185 cSt	1263 cSt	1400 cSt
(in centistokes + 37.8° C	11.51 cSt	11.42 cSt	10.33 cSt	10.80 cSt
+ 98.9° C	3.78 cSt	3.93 cSt	3.46 cSt	3.60 cSt
Density at 25°C (in g/cm3)	1.057	1.009	0.995	1.003
Water content (in %)	0.10 to 0.30	0.10 to 0.30	0.22	0.10
Flash point (in °C)	182	171	178	174
Fire point (in °C)	210	182	188	185
Auto-ignition point (in °C)	507	471	417	427
Bulk modulus (adiabatic) at 38° C (in bars)	28,200	25,200	18,063	14,479
Specific heat at 38° C (in cal/g/° C)	0.418	0.437	0.41	0.42
Thermal expansion factor (in °C to the power of -1)	846x10-6	918x10-6	0.895x10-3	0.86x10-3
Thermal conductivity at 38° C (J/s/cm/°C)	139.612x10-5			
Electrical conductivity				

R

CHARACTERISTICS	SKYDROL 500 B4	SKYDROL LD 4	HYJET IVAPLUS	HYJET V
(in microhms/cm)	0.38 to 0.43	0.39 to 0.47	1.83	0.50
Degree of contamination	Ref. 12-12-00, P. Block 1			
- new fluid	NSA307110 class 7			
- in service	NSA307110 class 9			

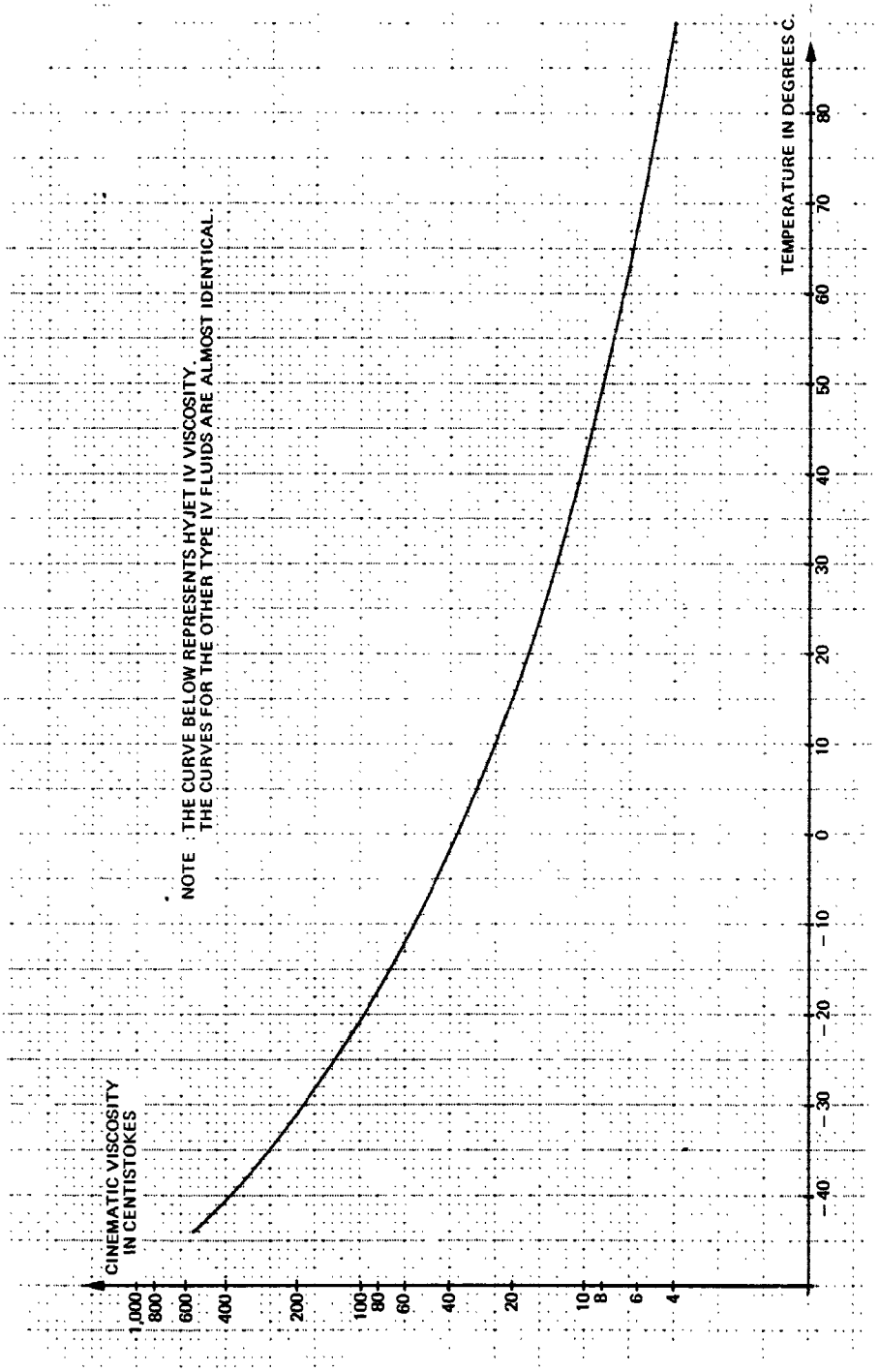
Utilization temperature : between -50° and +110°C.

(3)Special precautions
Precautions have been taken to avoid incompatibility between hydraulic fluid and some materials used in the fabrication of :
. seals (use of ethylene - propylene rubber)
. protective paints for equipment or structure (use of polyurethane paint)
Moreover, the hydraulic fluid utilization conditions are defined in the Maintenance Manual and particularly the precautions which must be taken to avoid mixing with mineral-base fluids, especially fluids to MILH83282 standard.
Similarly, the precautions to be taken when handling these fluids are also described in the Maintenance Manual.

B. Rigid Pipes and Fittings
(1)High pressure pipes
. Nominal pressure : 206 bars (3000 psi)
. 21-6-9 (Z4 CMN. 21-09-06) work hardened stainless steel to NSA384.510
. In all areas.

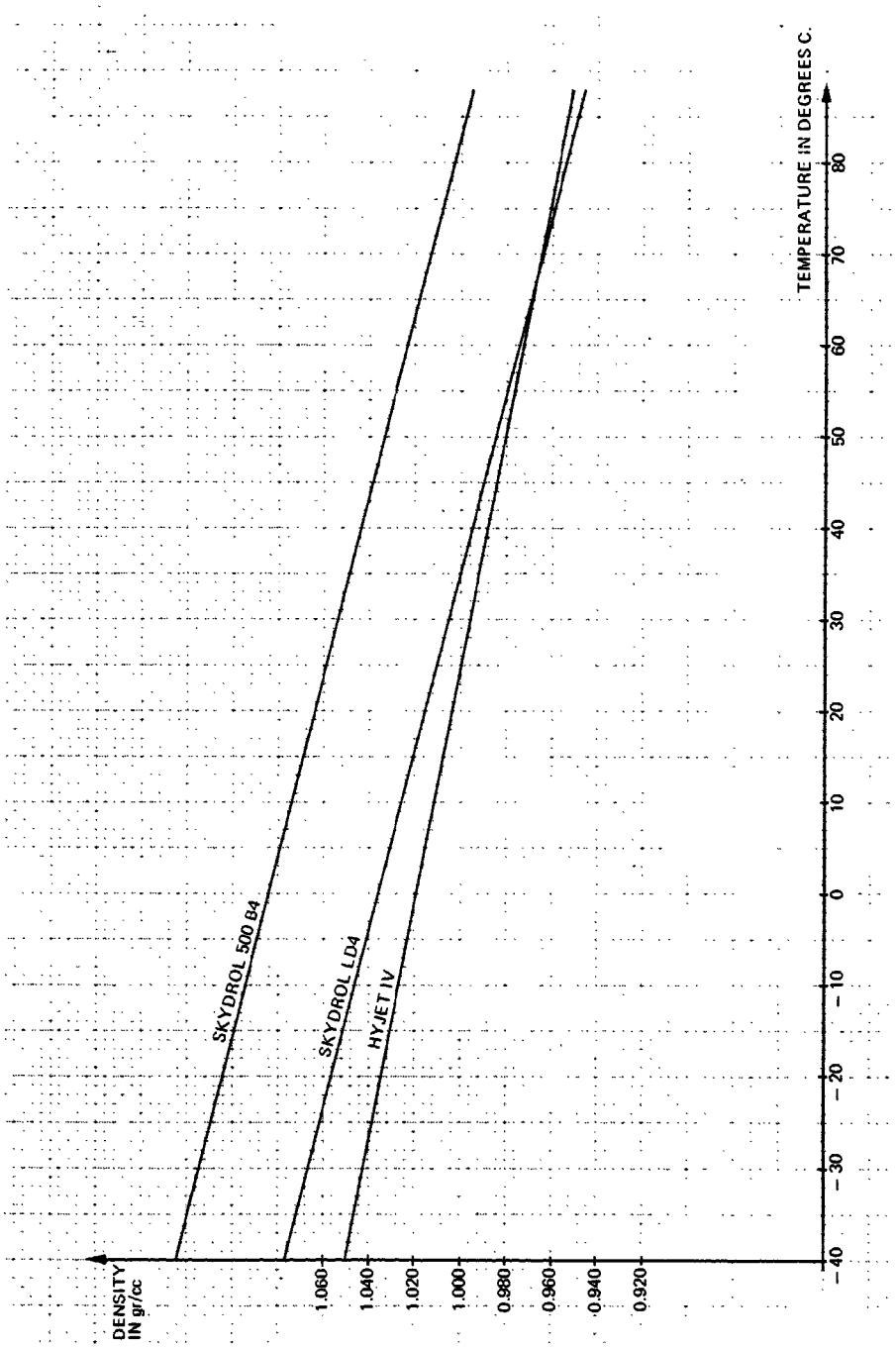
Outside Diameter	Thickness	Inside Dia.	Section (tubes)	Section (fluid)	Weight (tube) dens: 7.9	Weight (fluid) dens : 1	Weight (tube + fluid)
Inches mm	Inches mm	mm	mm	mm2	mm2	gr/m	gr/m	gr/m
1/4 6.35	0.016 0.406	5.478	8.100	23.568	64	23.5	87.5
3/8 9.525	0.020 0.508	8.509	14.390	56.865	113.7	56.8	170.5
1/2 12.700	0.026 0.660	11.380	24.964	101.712	197.2	101.7	298.9
5/8 15.875	0.033 0.838	14.199	39.587	158.345	312.7	158.3	471
3/4 19.050	0.039 0.991	17.070	56.170	228.852	443.7	228.8	672.5
1 25.400	0.052 1.321	22.760	99.858	406.850	788.87	406.8	1195.7

(fluid used in calculations is Skydrol LD for high density, fluid density d = 1.05)



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Cinematic Viscosity Versus Hydraulic Fluid Temperatures
Figure 020



BM5 29 00 00 0 ATMO

Density Versus Hydraulic Fluid Temperature Curve
Figure 021

(2)Low pressure pipes
(a)Return lines
Nominal pressure : 70 bars (1015 psi)
6061-T6 (AGSU-T6) light alloy to ICG 32-147.

Outside Diameter		Thickness		Inside Dia.	Section (tubes)	Section (fluid)	Weight (tube) dens: 2.8	Weight (fluid) dens : 1	Weight (tube + fluid)
Inches	mm	Inches	mm	mm	mm2	mm2	gr/m	gr/m	gr/m
1/4	6.35	0.035	0.89	4.57	15.25	16.41	42.7	16.4	59.1
3/8	9.52	0.035	0.89	7.74	24.00	47.13	67.2	47.1	114.3
1/2	12.70	0.035	0.89	10.92	32.98	93.68	92.3	93.6	186
5/8	15.87	0.035	0.89	14.09	41.85	156.07	117.1	156.0	273.2
3/4	19.05	0.035	0.89	17.27	50.72	234.30	142.0	234.3	376.3
1	25.40	0.048	1.22	22.96	92.60	414.10	259.2	414.1	673.4

(b)Suction lines
Nominal pressure : 4 bars (58 psi)
6061-T6 light alloy to IGC 04.32 147.

Outside Diameter	Thickness	Inside Dia.	Section (tubes)	Section (fluid)	Weight (tube) dens: 2.8	Weight (fluid) dens : 1	Weight (tube + fluid)
1 38.10 1/2	0.035 | 0.89	36.32	103.92	1036.16	290.9	1036.1	1327.1

(c)Special area lines (Fire zones and exposed zones : pylons, nacelles, wing roots)
Nominal pressure : 4 bars (58 psi)
21-6-9 stainless steel to NSA384 510

Outside Diameter	Thickness	Inside Dia.	Section (tubes)	Section (fluid)	Weight (tube) dens: 2.8	Weight (fluid) dens : 1	Weight (tube + fluid)
1 38.10 1/2	0.024 | 0.61	36.88	71.72	1068.36	566.6 dens: 7.9	1068.3	1635

(3)Other characteristics

	Stainless Steel 21-6-9	Light Alloy 6061-T6
Yld str 0.2	82.8 hb	24.5 hb
TS	98 hb	29.4 hb
Elong	20%	10%

(4)Fittings
- There are two types of fittings : (Ref. Fig. 022, 023)

(a)Swaged fittings
- **PERMASWAGE** permanent swaged fittings
- **HARRISON** removable swaged fittings
- **PERMASWAGE** special swaged fittings

(b)Removable unswaged fittings
These are **MS** or **NSA** type fittings. In some cases, where foolproofing is required, **AN** fittings are also used.
- Fitting materials
Fittings are made of the same material as the pipes which they connect, i.e. stainless steel or aluminum alloy, except :

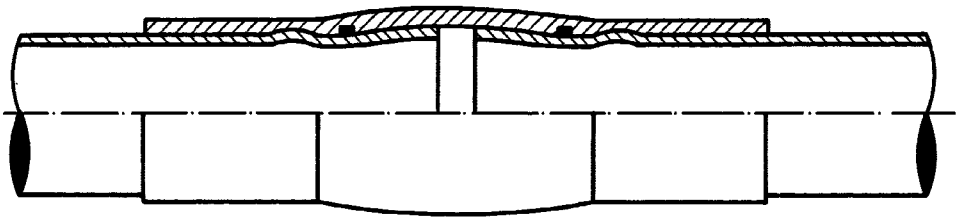
(c)The **HARRISON** sleeves, which are always in stainless steel, and some nuts and items connecting stainless steel pipes, which are in cadmium plated steel in zones other than fire zones.
- Typical examples are shown on the next page.

C. Flexible Hoses

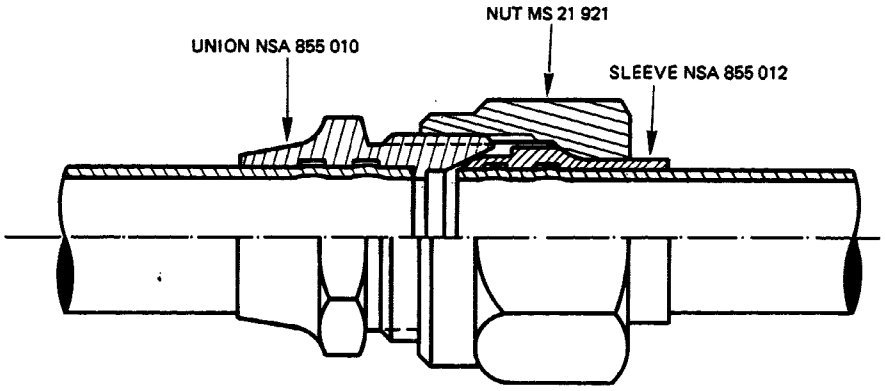
(1)Design
The flexible hoses are in **P T F E** covered with one or more layers of stainless steel braid. They are equipped with stainless steel swaged fittings.
There are two types of flexible hoses : high pressure and medium pressure. **All** the flexible hoses on the landing gear are **HP** hoses.

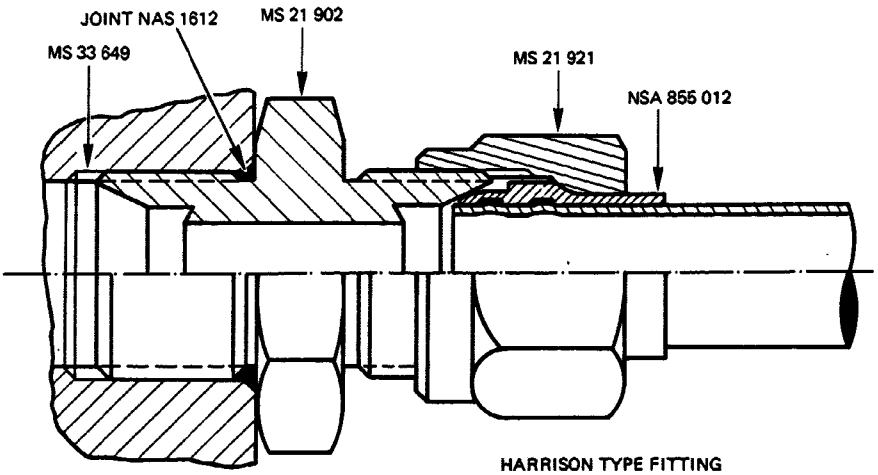
(2)Suppliers
TITEFLEX
High pressure : **NSA8537** (multibraid)
NSA8284 (unibraid)
Medium pressure : **NSA8536**
AEROQUIP
High pressure : **NSA8267** (unibraid)
Medium pressure : **NSA8266**

PERMASWAGE UNION NSA 855 006



HARRISON REMOVABLE SWAGED FITTING NSA 855 005





HARRISON TYPE FITTING

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Hydraulic Connections
Figure 022

D. Clamp Blocks - Clamps - Ligatures

(1)General

Parallel runs of several tubes are attached to the structure by clamp blocks and intermediate brackets.

In some runs, where there are only 1 or 2 tubes, clamps are used for attachment.

The distance separating two tubes in the same run will be 4.3 to 6 mm (0.17 to 0.24 in.).

(2)Clamp Blocks

Single clamp blocks defined by AEROSPATIALE drawings and clamp blocks to ASN-A0009 are used.

(3)Clamps

These are defined by NSA5576 or MS21104 with an ethylene- propylene 41-B8 protective cushion. These clamps are attached by 4.83 (0.19 in.) diameter screws and self-locking floating anchor nuts riveted to an intermediate support.

(4)Ligatures

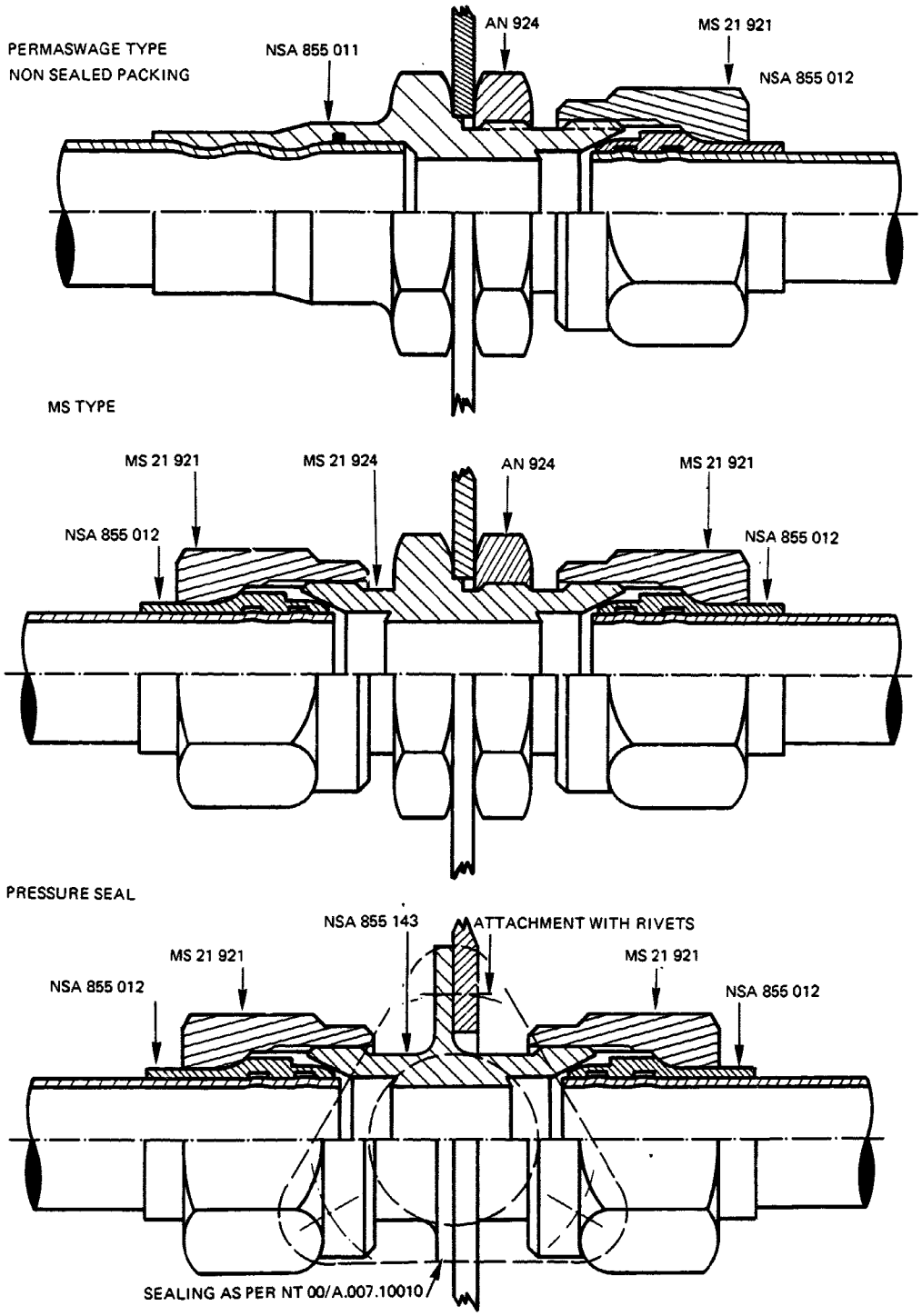
NSA5586 cushions are installed on small diameter pipes to prevent risks of vibration or fouling in certain cases. In some specific cases, NSA8420-0 ligatures are installed.

E. Elastomer Seals

All static and dynamic seals will be made of ethylene-propylene 41-B8.

Static seals under boss adapters are to NAS1612. It will be possible to adapt them to MS33649 bosses.

The other static and dynamic seals are to NAS1611, and must be fitted into NSA8604 grooves.



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Hydraulic Connections
Figure 023

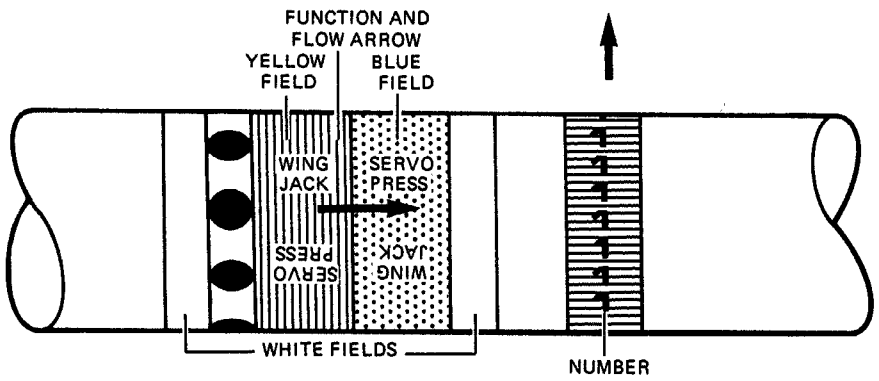
5. Hydraulic System Identification and Marking
(Ref. Fig. 024)

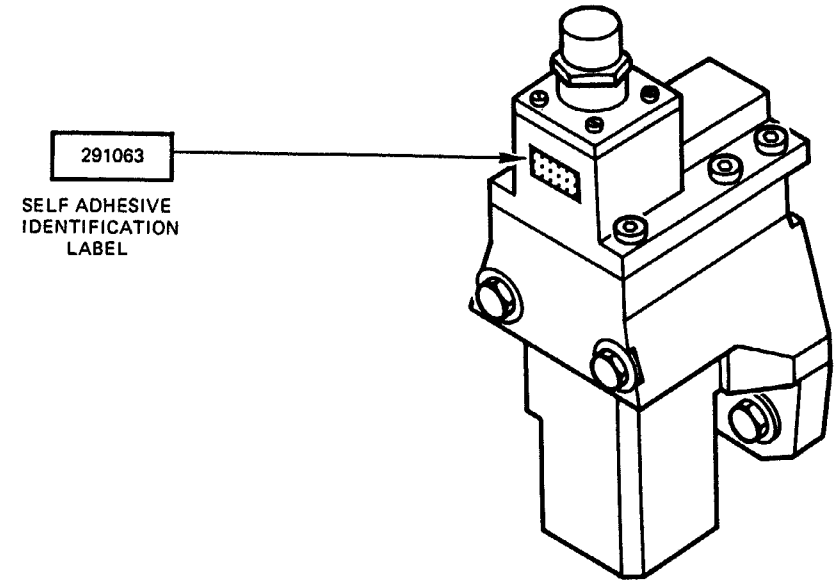
A. Rigid Pipes
Rigid pipes are identified in conformance with NSA0140 and 0141 by :
. The Part Number (e.g A2913161502300)
. An NSA0143 label identifying the pipe as a hydraulic pipe (black dots), its function (e.g CASE DRAIN) and the direction of fluid flow (arrow).
. An NSA0144 label identifying the system, comprising a colored band (green, blue, yellow) plus the figure 1, 2 or 3, indicating the Green, Blue or Yellow system respectively.
Long pipes are identified at both ends.

B. Flexible Hoses
Flexible hoses are identified in conformance with NSA0140 and 0142 by :
. A purple metal or heat shrinkable sleeve indicating that the fluid used
R is a phosphate ester to NSA307110.
. The Part Number, which figures either on the purple sleeve, or on a separate metal sleeve.

C. Components and Accessories (Ref. Fig. 025)
Hydraulic components and accessories are identified in conformance with NSA0140 by a 4-figure item number called out on the hydraulic Functional Diagram.
The numbers are on placards, one affixed on the component or accessory itself, and one on the support on which the component or accessory is mounted.
In the case of manifold-mounted components, the identification placards are affixed on each component and on that part of the manifold receiving the component. (When the component is too small, the indication is marked directly on the component).
All fittings on components or accessories are identified by an engraved letter indicated on the hydraulic Functional Diagram. Components are also identified by two NSA9000 placards :
. a purple placard identifying the hydraulic fluid
. a placard bearing the component designation.

HYDRAULIC SYSTEM NUMBER AND COLOR CODE		
NUMBER	COLOR CODE	SYSTEM
1	GREEN	GREEN SYSTEM
2	BLUE	BLUE SYSTEM
3	YELLOW	YELLOW SYSTEM





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System Line Identification
Figure 024

6. Technical Characteristics

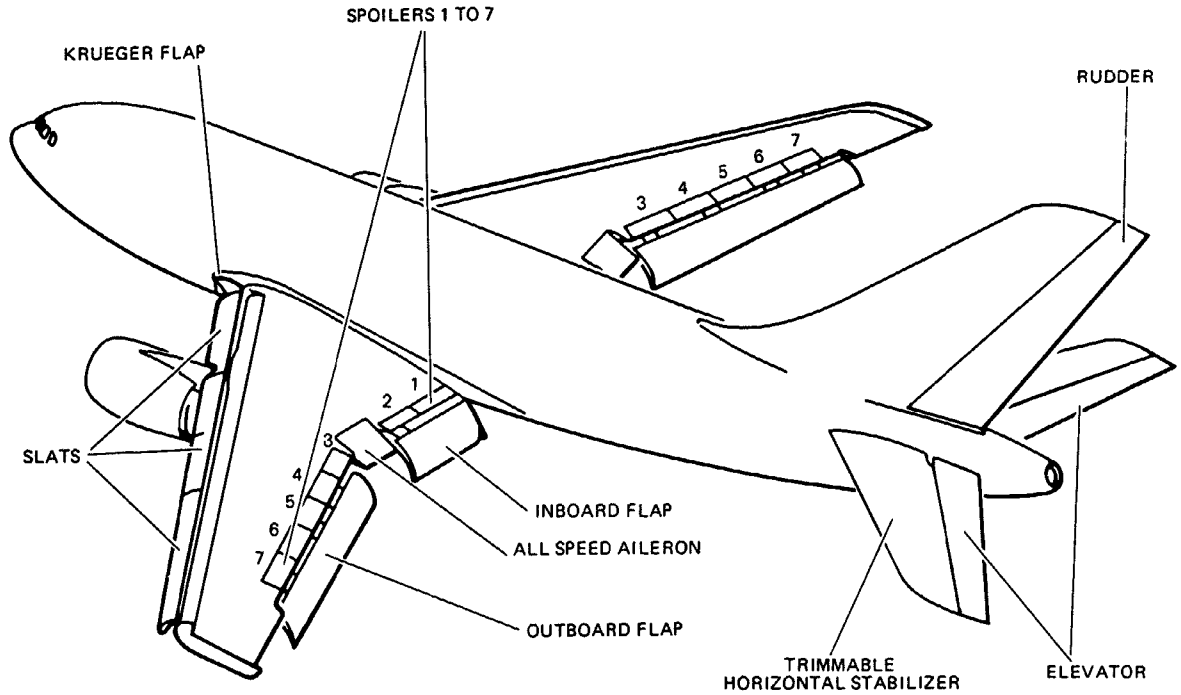
A. Pressure Values
System pressure is supplied by engine-driven pumps. Any extra power which may be required in flight is supplied by two electric pumps. These pumps are essentially used for operations on the ground.
Nominal operating pressure is 206 bars (3000 psi) +3 -0.

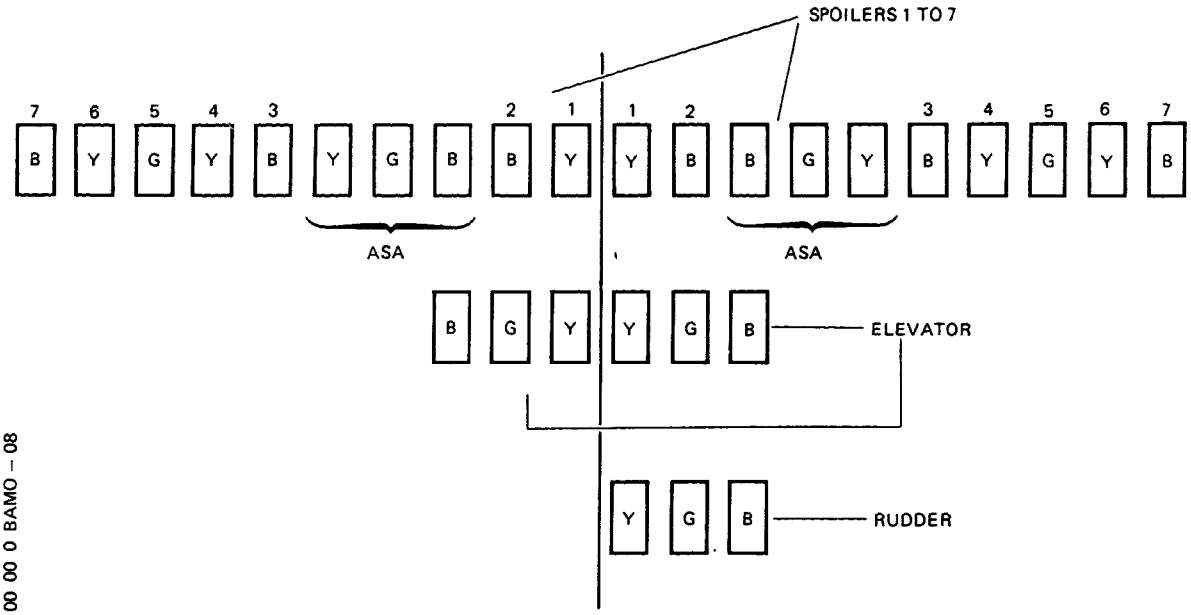
B. Servo Controls (Ref. Fig. 025, 026)
Ref. charts A and B : hydraulic leading particulars and consumption.

CHART A
SERVO CONTROLS LEADING PARTICULARS

	LARGE PISTON AREA (cm^2)	ANNULAR PISTON AREA (cm^2)	OPERATING STROKE (cm)	SURFACE DEFLECTION (degrees)
All speed aileron	38.15	27.63	11.25	23° up or down
Elevator	25.61	19.00	10.73	15° ± 1° A/C nose down 30° ± 1° A/C nose up
Rudder	49.48	49.48	14.5	30° left or right
Spoilers 5,6,7	28.9	21.9	6.8	Roll : 20° with slats retracted 35° with slats extended Ground spoiler: 50°
Spoilers 1,2	51.5	39.2	6.8	Speed brake : 22.5° Ground spoiler: 50°
Spoilers 3,4	51.5	39.2	6.8	Roll : 20° with slats retracted 35° with slats extended Speed brake : 45° Ground spoiler: 50°

All speed aileron, spoiler and elevator servo controls are of the differential section type, only the rudder servo controls are of the equal section type.





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Areas and Servo Controls
Figure 025

CHART B

SERVO CONTROLS CONSUMPTION

	l/mn						INTERNAL LEAKAGE WHEN NEW
	FLOW RATE IN LARGE CHAMBER	FLOW RATE IN ANNULAR CHAMBER	FLOW RATE IN LARGE CHAMBER	FLOW RATE IN ANNULAR CHAMBER	FLOW RATE IN LARGE CHAMBER	FLOW RATE IN ANNULAR CHAMBER	
ALL SPEED AILERON	51°/s MAX SPEED WITHOUT EXTERNAL LOAD	47°/s	20°/s		4°/s		
	34.4 l/mn	23.2 l/mn	11.28 l/mn	7.6 l/mn	2.26 l/mn	1.62 l/mn	0.2 l/mn
ELEVATOR ★	34°/s MAX SPEED WITHOUT EXTERNAL LOAD	39°/s	20°/s		4°/s		
	12.5 l/mn	10.6 l/mn	7.35 l/mn	5.435 l/mn	1.47 l/mn	1.087 l/mn	0.8 l/mn
SPOILERS 3, 4, 5, 6, 7	50°/s MAX SPEED WITHOUT EXTERNAL LOAD		20°/s		4°/s		
	12.16 l/mn	8.94 l/mn	4.86 l/mn	3.576 l/mn	0.972 l/mn	0.715 l/mn	0.75 l/mn
SPOILERS 1, 2	50°/s MAX SPEED WITHOUT EXTERNAL LOAD		20°/s		4°/s		
	21.02 l/mn	16.02 l/mn	8.40 l/mn	6.40 l/mn	1.68 l/mn	1.28 l/mn	0.85 l/mn
RUDDER	60°/s MAX SPEED WITHOUT EXTERNAL LOAD		20°/s		4°/s		
	43 l/mn		14.34 l/mn		2.87 l/mn		0.65 l/mn

★ NOTE: ONLY ELEVATOR SERVO CONTROLS ARE FITTED WITH HEATING SYSTEM

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Chart B - Servo Controls Consumption
Figure 026

C. Other Flight Control Components

	PISTON AREA (cm^2)	STROKE (cm)	TIME (s)	MAX CONSUMPTION OF ACTUATOR (l/mn)	PERMANENT CONSUMPTION (l/mn)	
AP pitch actuator	4.5	± 1.7	0.7	0.698	0.65	Elev 22° up or down
AP yaw actuator	4.5	± 1.7	0.7	0.698	0.65	Rudder 20° right or left
AP roll actuator	4.5	± 1.7	0.7	0.698	0.65	Control wheel 70.6° right or left
Pitch artificial feel actuator	5.72	7.5	2	1.29	0.65	
Yaw damper actuator	3.5	± 1.2	0.3	0.42	0.65	Rudder 12° right or left

- Krueger flap actuator : 8.25 l/mn (Krueger flap retracted)
  6.75 l/mn (Krueger flap extended)
- THS actuator motor : 66 l/mn at 1°/s
  46.2 l/mn at 0.7°/s
  Internal leakage : 0.15 l/mn
  THS deflection : 3° A/C nose down
  14° A/C nose up
- Slat PCU motor : 44 l/mn
- Flap PCU motor : 95 l/mn
- Droop actuator : negligible

Flap and slat control lever position	1	2	3	4	5
Slat extension	0	15	15	20	30
Krueger flap extension	retracted	extended	extended	extended	extended
Flap extension	0	0	15	20	40

D. Landing Gear
(Ref. Fig. 027)
(3)Flow rates in operation
- Main landing gear
  Retraction : 67 l/mn/actuating cylinder
  Extension : 65 l/mn/actuating cylinder
- Nose landing gear
  Retraction : 30 l/mn
  Extension : 4 l/mn
- Main landing gear doors
  Opening : 57 l/mn
  Closing : 37 l/mn
- Nose landing gear doors
  Opening : 21 l/mn
  Closing : 15 l/mn

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(1) ACTUATING CYLINDER DISPLACEMENT

GEAR ACTUATING CYLINDER	STROKE	EXTENSION SECTIONAL AREA	EXTENSION DISPLACEMENT	RETRACTION SECTIONAL AREA	RETRACTION DISPLACEMENT	AIRCRAFT COEFFICIENT
MAIN GEAR	36.9 cm	259.4 cm²	9.6 l	210 cm²	7.75 l	2
NOSE GEAR	54.4 cm	10.4 cm²	0.56 l	60.4 cm²	3.3 l	1
MLG BRACE STRUT	22.5 cm	8.615 cm²	0.193 l	3.56 cm²	0.08 l	2
DOOR ACTUATING CYLINDER	STROKE	OPENING SECTIONAL AREA	OPENING DISPLACEMENT	CLOSING SECTIONAL AREA	CLOSING DISPLACEMENT	AIRCRAFT COEFFICIENT
MAIN GEAR	45.3 cm	31.67 cm²	1.44 l	20.32 cm²	0.92 l	2
NOSE GEAR	19.5 cm	17.7 cm²	0.35 l	12.7 cm²	0.25 l	2

(2) OPERATING TIMES

(THESE TIMES ALLOW FOR TRAVEL INITIATION AND SLOW - DOWN)

– MAIN GEAR :

RETRACTION
- DOOR OPENING : 1.5 SECONDS
- GEAR RETRACTION : 8.5 SECONDS
- DOOR CLOSING : 2.5 SECONDS

EXTENSION
- DOOR OPENING : 1.7 SECONDS
- GEAR EXTENSION : 10.5 SECONDS
- DOOR CLOSING : 2.8 SECONDS

– NOSE GEAR :

RETRACTION
- DOOR OPENING : 1 SECOND
- GEAR RETRACTION : 9 SECONDS
- DOOR CLOSING : 1.1 SECONDS

EXTENSION
- DOOR OPENING : 1.1 SECONDS
- GEAR EXTENSION : 10.5 SECONDS
- DOOR CLOSING : 1.2 SECONDS

Actuating Cylinder Displacement - Operating Times
Figure 027

E. Analysis of Available and Required Flow at the Various Phases of Flight
(1)Permanent leakage hypotheses (new servo controls and motors)

	Internal leakage per unit	Green system		Blue system		Yellow system	
	l/mn	No. of servo controls	Total leakage	No. of servo controls	Total leakage	No. of servo controls	Total leakage
Servo controls:ASA	0.2	2	0.4	2	0.4	2	0.4
Elevator	0.8	2	1.6	2	1.6	2	1.6
Rudder	0.65	1	0.65	1	0.65	1	0.65
Spoilers 1,2	0.85	-	-	2	1.7	2	1.7
Spoilers 3,4	0.75	-	-	2	1.5	2	1.5
Spoilers 5, 6, 7	0.75	2	1.5	2	1.5	2	1.5
Motors :							
THS actuator	0.15	1	0.15	-	-	1	0.15
Slat PCU	0.5	1	0.5	1	0.5	-	-
Flap PCU	0.5	1	0.5	-	-	1	0.5
Actuators : AP	0.65	3	1.95	-	-	3	1.95
Pitch artificial Feel	0.65	1	0.65	-	-	1	0.65
Yaw damper	0.65	-	-	1	0.65	1	0.65
PTU	0.75	2	1.5	-	-	-	-
TOTAL			9.40		8.5		11.25

(2)Green system
(Ref. Fig. 028)
(a)With new servo controls and motors
1 Takeoff
- Opening of landing gear doors
Mean operating speed of the servo controls on the three axes : 4°/s

2 ASA servo controls	2.26 + 1.62	= 3.88
2 Elevator servo controls	1.47 x 2	= 2.94
1 Rudder servo control		= 2.87
1 Spoiler (5) servo control		= 0.97
		10.66 l/mn

- Leakage (new servo controls)

1 Spoiler (5) servo control	0.75
1 THS actuator motor	0.15
1 Flap PCU motor	0.5
1 Slat PCU motor	0.5
3 AP actuator servomotors	1.95
1 Pitch artf. feel actuator	0.65
2 PTU motors	1.5
	6.00 l/mn

- Opening of landing gear doors

Main gear	57 x 2	= 114
Nose gear	21 x 2	= 42
		156 l/mn

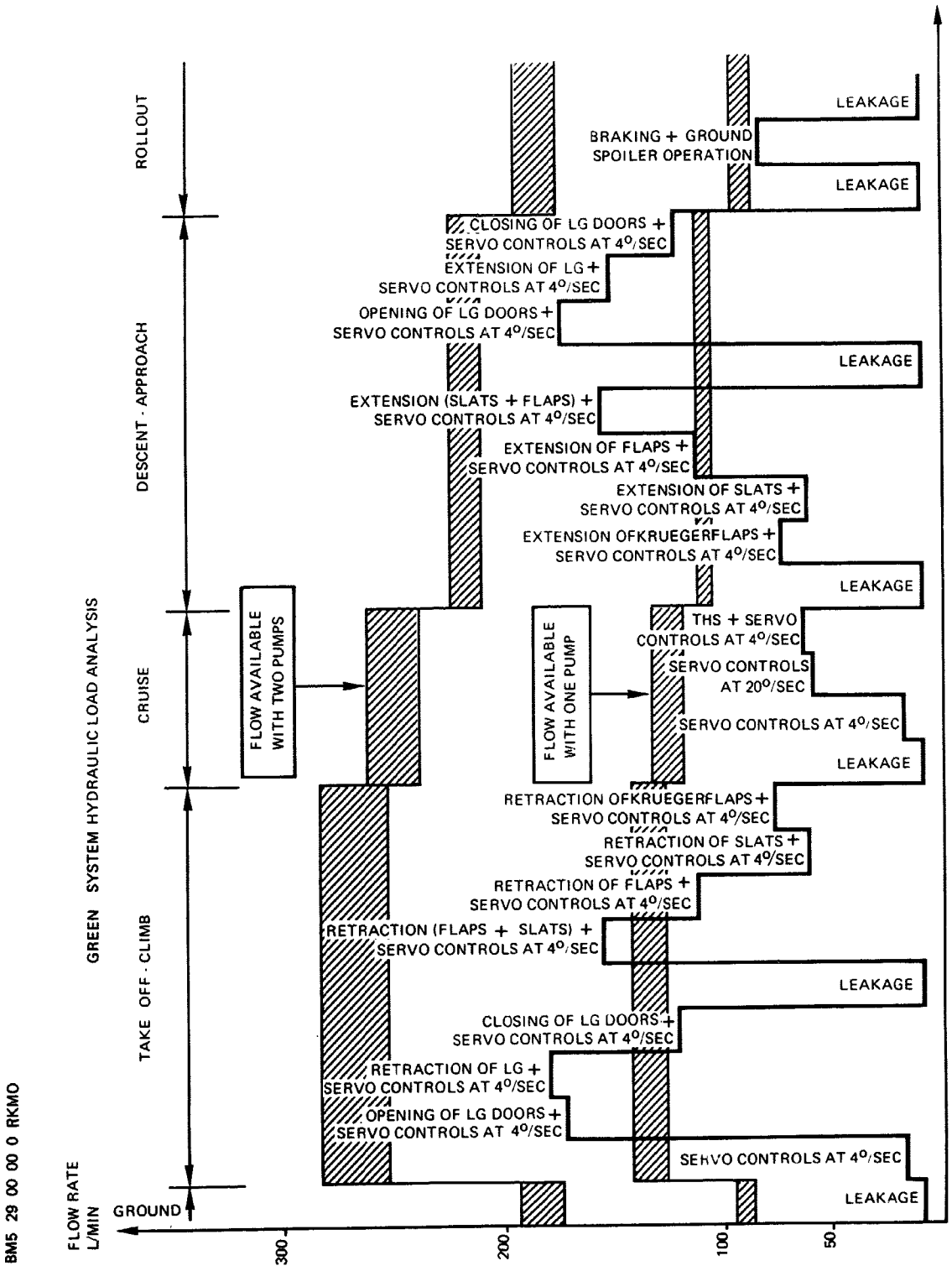
Total flow during opening of landing gear doors :
10.66 + 6 + 156 = 172.66 l/mn

- Landing gear retraction

Operation of servo controls on the three axes at 4°/s		10.66 l/mn
Leakage		6 l/mn
Retraction of main landing gears	67 x 2	= 134 l/mn
Retraction of nose landing gear		30 l/mn

Total flow during landing gear retraction :
10.66 + 6 + 134 + 30 = 180.66 l/mn

- Closing of landing gear doors
10.66 + 6 + 74 + 30 = 120.66 l/mn


GREEN SYSTEM HYDRAULIC LOAD ANALYSIS
ROLLOUT
DESCENT - APPROACH
CRUISE
TAKE OFF - CLIMB
GROUND
FLOW RATE L/MIN
300
200
100
50
FLOW AVAILABLE WITH TWO PUMPS
FLOW AVAILABLE WITH ONE PUMP
LEAKAGE
BRAKING + GROUND SPOILER OPERATION
LEAKAGE
CLOSING OF LG DOORS + SERVO CONTROLS AT 4°/SEC
EXTENSION OF LG + SERVO CONTROLS AT 4°/SEC
OPENING OF LG DOORS + SERVO CONTROLS AT 4°/SEC
LEAKAGE
EXTENSION (SLATS + FLAPS) + SERVO CONTROLS AT 4°/SEC
EXTENSION OF FLAPS + SERVO CONTROLS AT 4°/SEC
EXTENSION OF SLATS + SERVO CONTROLS AT 4°/SEC
EXTENSION OF KRUEGER FLAPS + SERVO CONTROLS AT 4°/SEC
LEAKAGE
THS + SERVO CONTROLS AT 4°/SEC
SERVO CONTROLS AT 20°/SEC
SERVO CONTROLS AT 4°/SEC
LEAKAGE
RETRACTION OF KRUEGER FLAPS + SERVO CONTROLS AT 4°/SEC
RETRACTION OF SLATS + SERVO CONTROLS AT 4°/SEC
RETRACTION OF FLAPS + SERVO CONTROLS AT 4°/SEC
RETRACTION (FLAPS + SLATS) + SERVO CONTROLS AT 4°/SEC
LEAKAGE
CLOSING OF LG DOORS + SERVO CONTROLS AT 4°/SEC
RETRACTION OF LG + SERVO CONTROLS AT 4°/SEC
OPENING OF LG DOORS + SERVO CONTROLS AT 4°/SEC
SERVO CONTROLS AT 4°/SEC
LEAKAGE
BM5 29 00 00 0 RKMO

Green System Hydraulic Load Analysis
Figure 028

2 Climb - Approach
- Operation of flaps alone + servo controls on the three axes at 4°/s.
  10.66 + 5.5 + 95 = 111.16 l/min

- Operation of slats alone + servo controls on the three axes at 4°/s.
  10.66 + 5.5 + 44 = 60.16 l/mn

- Operation of slats and flaps + servo controls on the three axes at 4°/s.
  10.66 + 5 + 95 + 44 = 154.66 l/mn

- Retraction of slats, servo controls on the three axes + Krueger flaps
  10.66 + 5.5 + 44 + 16.5 = 76.66 l/mn

- Operation of THS + servo controls on the three axes at 4°/s.
  46.2 + 5.85 + 10.66 = 62.71 l/mn

3 Cruise
- Normal (surface deflection : 4°/s on the three axes)
  10.66 + 6 = 16.66 l/mn

- In turbulence : (surface deflection : 20°/s on the three axes)

2 ASA servo controls	11.28 + 7.6	=	18.88
2 elevator servo controls	7.35 x 2	=	14.70
1 rudder servo control		=	14.34
1 spoiler (5) servo control		=	4.86
			52.78 l/mn

  TOTAL : 52.78 + 6 = 58.78 l/mn

4 Approach - Descent
- Servo controls at 4°/s + opening of landing gear doors
  10.66 + 6 + 114 + 42 = 172.66 l/mn

- Servo controls at 4°/s + landing gear extension
  10.66 + 6 + 130 + 4 = 150.66 l/mn

- Servo controls at 4°/s + closing of landing gear doors
  10.66 + 6 + 74 + 30 = 120.66 l/mn

5 Landing
- Braking 50 l/mn

- Ground spoiler

2 spoilers (5)	12.16 x 2	=	24.32 l/mn

- Leakage

2 ASA servo controls	2 x 0.2	=	0.4
2 Elevator servo controls	2 x 0.8	=	1.6

1 Rudder servo control	=	0.65	
THS	=	0.15	
Flaps	=	0.5	
Slats	=	0.5	
AP	=	1.95	
Pitch artf feel	=	0.65	
PTU	=	1.5	
		7.90	l/mn
TOTAL : 50 + 24.32 + 7.9	=	82.22	l/mn

(b)With used servo controls and motors (20 l/mn permanent leakage)

1 Takeoff

Most unfavorable hypothesis : no operation of servo controls (max internal leakage rate)

- Opening of landing gear doors			
156 + 20	=	176	l/mn
- Landing gear retraction			
164 + 20	=	184	l/mn
- Closing of landing gear doors			
104 + 20	=	124	l/mn

2 Climb - approach

- Operation of flaps alone			
95 + 20	=	115	l/mn
- Operation of slats alone			
44 + 20	=	64	l/mn
- Operation of flaps plus slats			
95 + 44 + 20	=	159	l/mn

3 Cruise

- Normal : 20 l/mn			
- In turbulence : 52.78 + 20	=	72.78	l/mn

4 Landing

- Braking	=	50	
- Ground spoiler			
2 spoilers (5) 12.16 x 2	=	24.32	
- Leakage	=	20	
		94.32	l/mn

(3)Blue system (Ref. Fig. 029)

(a)With new servo controls and motors

1 Climb - approach

Operation of slats + servo controls on the three axes at 4°/s.

- Servo controls

2 ASA servo controls			3.88
1 Spoiler (7) servo control			0.97
1 Spoiler (3) servo control			1.68
2 Elevator servo controls			2.94
1 Rudder servo control			2.87
			12.34 l/mn

- Leakage (new servo controls)

2 Spoiler (2) servo controls			1.7
1 Spoiler (7) servo control			0.75
1 Spoiler (3) servo control			0.75
1 Yaw damper actuator servomotor			0.65
			3.85 l/mn

- Slat PCU motor 44.00 l/mn

TOTAL : 12.34 + 3.85 + 44 = 60.19 l/mn

2 Cruise

- Normal

Servo controls at 4°/s on the three axes + leakage

12.34 + 4.35 = 16.68 l/mn

- In turbulence (servo controls at 20°/s)

2 ASA servo controls	11.28 + 7.6	=	18.88
1 Spoiler (7) servo control		=	4.86
1 Spoiler (3) servo control		=	8.40
2 Elevator servo controls	7.35 x 2	=	14.70
1 Rudder servo control		=	14.34
		=	63.18 l/mn

Leakage

2 Spoiler (2) servo controls		1.7
2 Yaw damper actuator servomotors		0.65
1 Spoiler (7) servo control		0.75
1 Spoiler (3) servo control		0.75
1 Slat PCU motor		0.5
		4.35 l/mn

TOTAL : 63.18 + 4.35 = 67.53 l/mn

(b)With used servo controls and motors (25 l/mn permanent leakage)

1 Climb - approach

Operation of slats, but no operation of servo controls

Slat PCU motor	44
Servo control leakage	25
	69 l/mn

2 Cruise

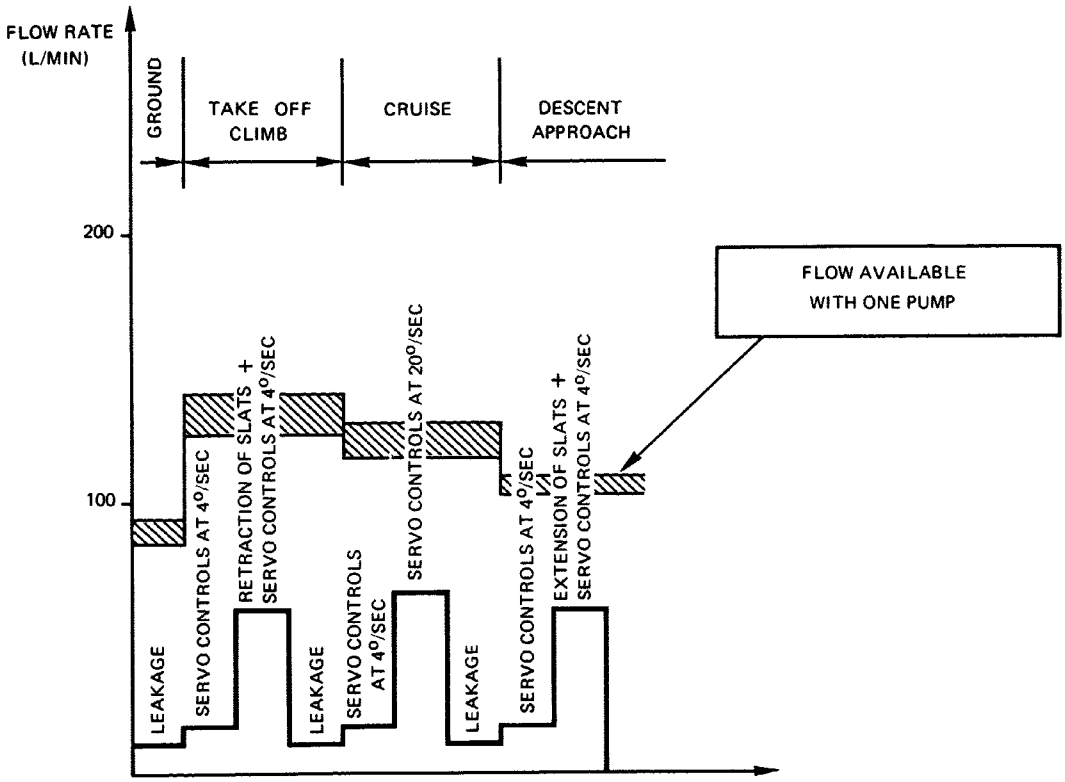
- Normal : 25 l/mn (permanent leakage without operation of servo controls)

- In turbulence :

Servo controls at 20°/s on the three axes	61.18
Leakage	25
	86.18 l/mn

BLUE SYSTEM

HYDRAULIC LOAD ANALYSIS



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Blue System Hydraulic Load Analysis
Figure 029

(4)Yellow system (Ref. Fig. 030)
(a)With new servo controls and motors
1 Climb - approach
- Operation of flaps + servo controls on the three axes at 4°/s
. Operation of servo controls at 4°/s

2 ASA servo controls	2.26 + 1.62	=	3.88
1 Spoiler (6) servo control		=	0.97
1 Spoilers (4) servo control		=	1.68
2 Elevator servo control	1.47 x 2	=	2.94
1 Rudder servo control		=	2.87
			12.34 l/mn

. Leakage (new servo controls)

2 Spoiler (1) servo controls	=	1.7
1 Spoiler (6) servo control	=	0.75
1 Spoiler (4) servo control	=	0.75
3 AP actuator servomotors	=	1.95
1 Pitch artf feel actuator	=	0.65
1 Yaw actuator servomotor damper	=	0.65
	=	6.45 l/mn

. Flaps : 95 l/mn

TOTAL : 12.34 + 6.45 + 95 = 113.79 l/mn

- Operation of servo controls on the three axes at 4°/s + THS
. Servo controls + leakage = 18.79
. THS = 46.2
TOTAL : 18.79 + 46.2 = 64.99 l/mn

2 Cruise
- Normal : servo controls at 4°/s on the three axes
12.34 + 6.45 = 18.79 l/mn

- In turbulence : servo controls at 20°/s on the three axes

2 ASA servo controls	11.28 + 7.6	=	18.88
1 Spoiler (6) servo control		=	4.86
1 Spoiler (4) servo control		=	8.40
2 Elevator servo controls	7.35 x 2	=	14.70
1 Rudder servo control		=	14.34

		=	61.18 l/mn
Leakage		=	6.45
THS		=	46.2
			113.83 l/mn

3 Landing
- Normal

Ground spoiler (extension of flaps at max speed)

2 spoilers (1)	21.02 x 2	=	42.04 l/mn
2 spoilers (4)	21.02 x 2	=	42.04 l/mn
2 spoilers (6)	12.16 x 2	=	24.32 l/mn

Leakage :		
11.25 - (2x0.85 + 2x0.75 + 2x0.75)	=	6.55
TOTAL : 108.4 + 6.55	=	114.95 l/mn

- Emergency (braking with anti-skid + Yellow system)

Leakage	=	11.25
Braking	=	50
	=	61.25 l/mn

(b)With used servo controls and motors (25 l/mn permanent leakage)

1 Climb - approach
- Operation of flaps + THS but no operation of servo controls

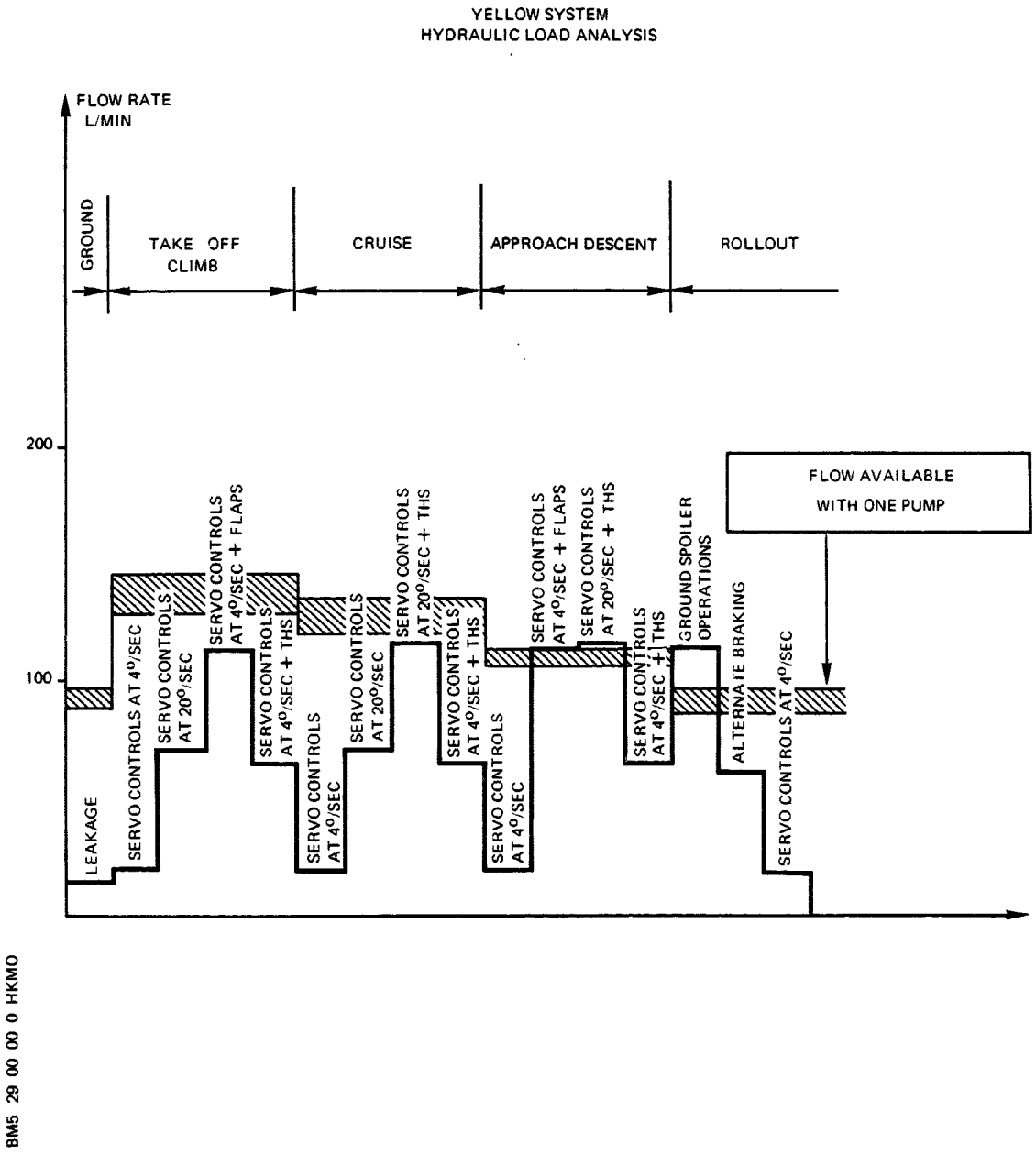
Flaps	95
THS	46.2
Leakage	25
	166.2 l/mn

2 Cruise
- Normal

Permanent leakage without operation of servo controls 25 l/mn

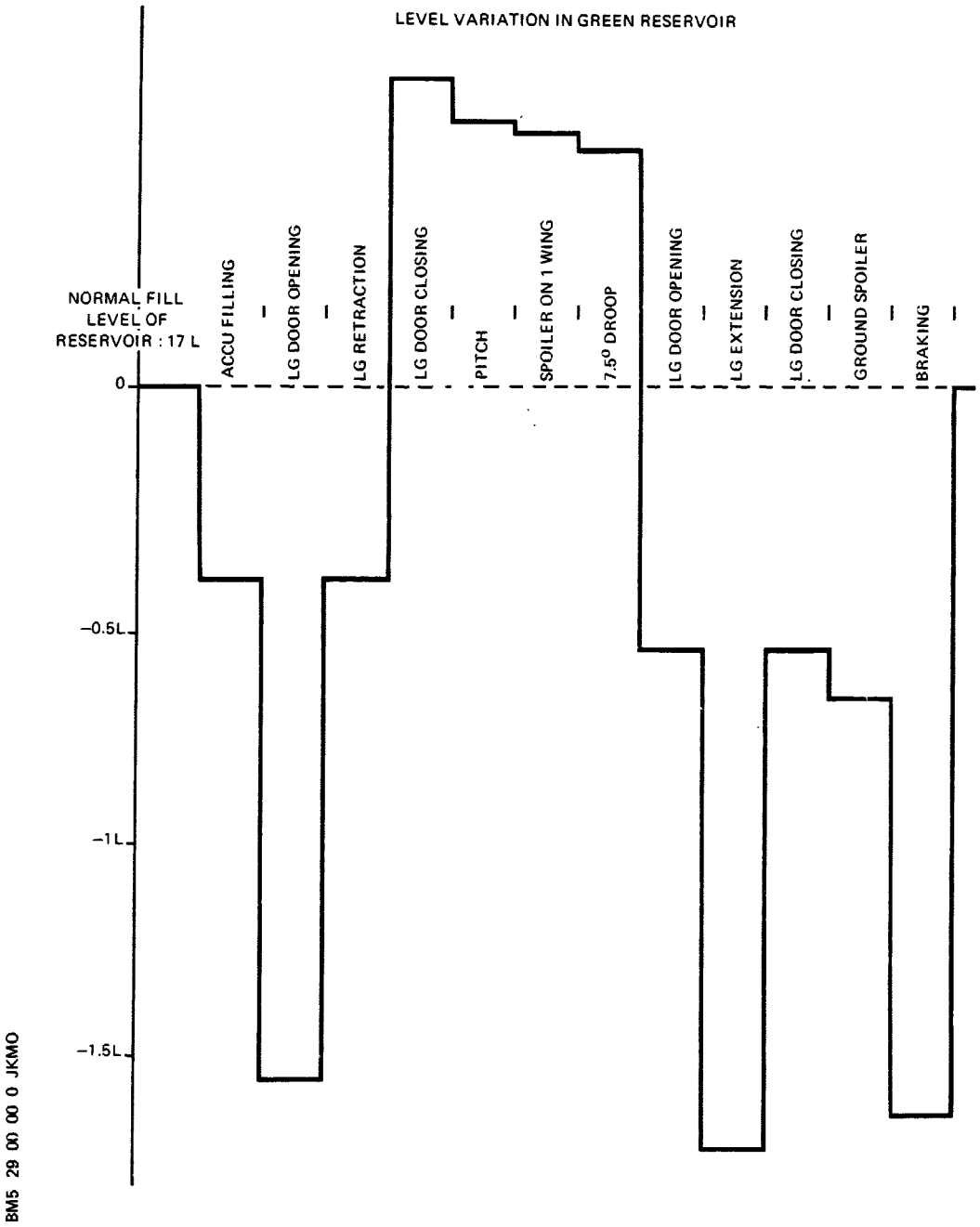
- In turbulence

Servo controls at 20°/s on the three axes	=	61.18
Leakage	=	25
		86.18 l/mn

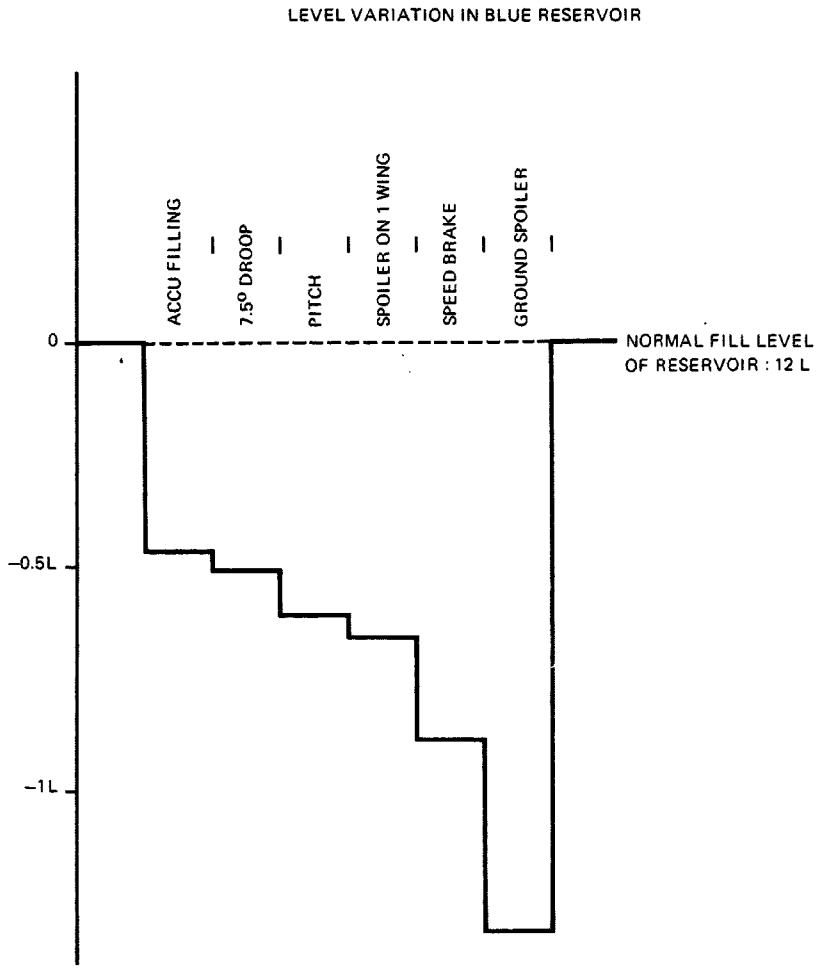


Yellow System Hydraulic Load Analysis
Figure 030

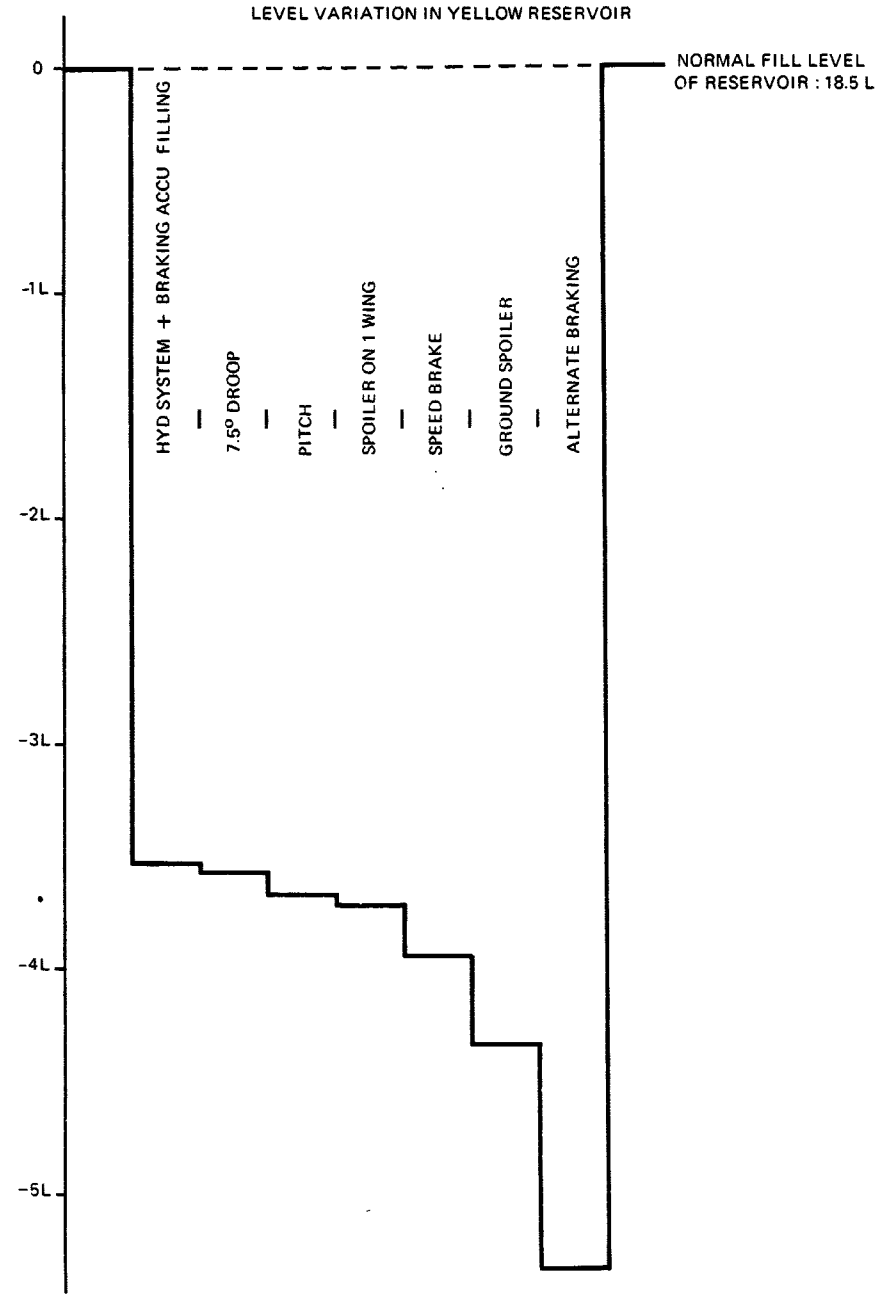
F. In Flight Variations in Reservoir Fluid Level
Level variations in the three reservoirs during a theoretical flight are shown (Ref. Fig. 031, 032, 033). They are based on the following configuration (fill level taken as reference) :
- accumulators empty of fluid and charged to normal charging pressure
- all spoilers, slats, flaps retracted
- landing gear extended, gear doors closed
- control surfaces at neutral
- cargo compartment doors closed.



Level Variation in Green Reservoir
Figure 031



Level Variation in Blue Reservoir
Figure 032



Level Variation in Yellow Reservoir
Figure 033

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Hydraulic System Pressurization

A. Prior to pressurizing hydraulic system :
(1)Ensure all personnel and equipment is clear of flight controls and landing gear doors.
(2)Obtain clearance to pressurize hydraulic system from ground personnel
R by use of the ground interphone system or other means.
R

2. Hydraulic Fluid Safety Precautions
Mixing of phosphate ester type hydraulic fluid with mineral-base fluid is prohibited. Such a mixture produces a jelly in hydraulic systems, and aircraft safety may be adversely affected.
Since these types of fluid are used in the hydraulic systems and landing gear shock absorbers respectively, foolproofing precautions shall be taken to prevent any inadvertent mixing.

A. Precautions to be Observed by Personnel
Prior to any servicing of the hydraulic system, personnel should observe and thoroughly understand the following precautions when working with hydraulic fluid.
WARNING : OBSERVE THE FOLLOWING SAFETY PRECAUTIONS WHEN WORKING ON THE HYDRAULIC SYSTEM. LONG EXPOSURE TO HYDRAULIC FLUID CAN CAUSE SKIN DEHYDRATION AND CHAPPING.
(1)Wash hands thoroughly with soap and water before starting work.
(2)Airbus does not recommend the use of protective barrier creams as they do not provide complete protection.
(3)Wear goggles when pressure testing components or systems, and whenever there is a possibility of hydraulic fluid splashing into the eyes.
(4)If hydraulic fluid splashes into eyes, treat eyes immediately by irrigating thoroughly with clear cold water, and report the incident.
(5)Wash hands, wrists, and forearms with soap and hot water whenever they have been in contact with hydraulic fluid.
(6)If clothing becomes soaked with hydraulic fluid, remove clothing as soon as possible.

3. Technical Precautions
CAUTION : OBSERVE THE FOLLOWING TECHNICAL PRECAUTIONS WHEN WORKING ON THE

HYDRAULIC SYSTEM. HYDRAULIC FLUID WILL ATTACK A WIDE RANGE OF MATERIALS INCLUDING RUBBER, COPPER, TITANIUM, VARIOUS PLASTICS, AND PAINTS.

A. Ensure that hydraulic fluid does not come into contact with aircraft outside of hydraulic system. Keep spillage to an absolute minimum. Clean up spilled hydraulic fluid immediately to prevent entry into adjacent areas and to prevent future false hydraulic leak reports. If spillage occurs, wipe up the fluid with a dry cloth, and wash contaminated area with solvent (material No. 11-003 Ref. 20-31-00).
WARNING : CLEANING OPERATIONS USING SOLVENTS SHOULD BE PERFORMED IN A WELL VENTILATED ATMOSPHERE. EXERCISE NORMAL SAFETY PRECAUTIONS DURING USE.

B. When washing metal parts before assembly, use only solvent (Material No. 11-003), and ensure that all traces of the solvent are removed before assembly.

C. Use only approved hydraulic fluid when filling reservoirs, filter bowls, pumps, etc., before installation of components.

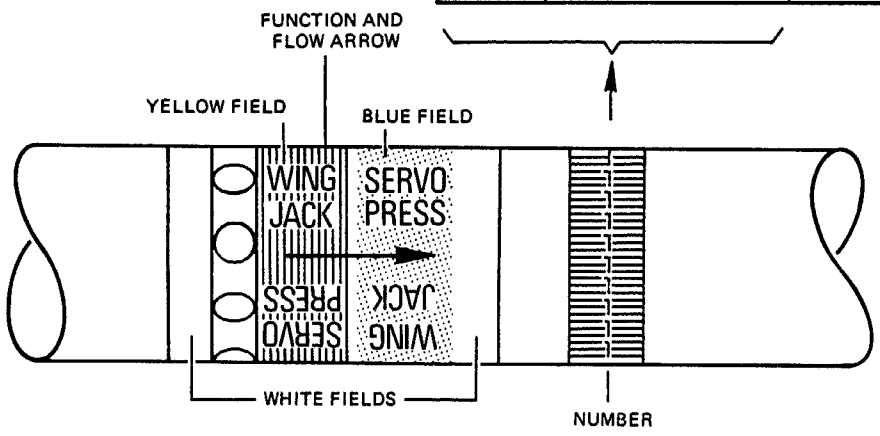
D. Take care to prevent contamination of hydraulic fluid with other unapproved fluids, fuel, oils, water, or dirt.

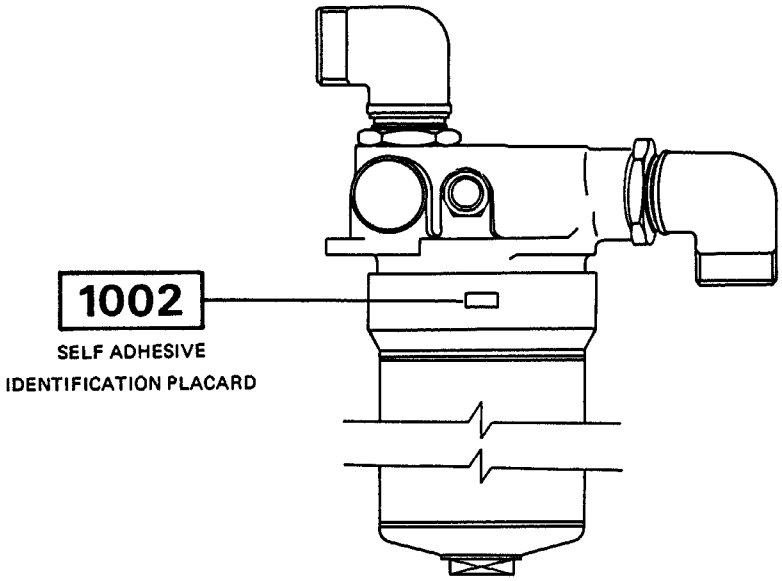
E. If a system becomes contaminated, reclaim the hydraulic fluid (Ref. 12-36-29, P. Block 1).

F. Prior to connecting hydraulic power or replenishing carts to the aircraft make certain that cart fluid specification meets aircraft requirements.

4. System Line and Component Identification
(Ref. Fig. 301)
The lines of each hydraulic system are placarded with Skydrol-resistant bands or identification rings, on which are indicated the system color code, a brief description of the line function, and the direction of fluid flow. A number is marked on each line in accordance with NSA standard 0143-0144.
Hydraulic components are identified by means of self-adhesive placards showing the component number as given on the hydraulic system general drawing. The identification placards must also indicate NSA standard 307110, which states the hydraulic fluids which may be used. As a rule, numbers beginning with 1, 2 or 3 are used for Green, Blue or Yellow system components respectively.
Electro-hydraulic components bear only hydraulic numbers. Electrical identification is not shown.

HYDRAULIC SYSTEM NUMBER AND COLOR CODE		
NUMBER	COLOR CODE	SYSTEM
1	GREEN	GREEN SYSTEM
2	BLUE	BLUE SYSTEM
3	YELLOW	YELLOW SYSTEM





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System Line and Component Identification
Figure 301

5. Draining of Hydraulic Reservoirs

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

NOTE : Draining described in this section is effective for Green, Blue and Yellow reservoirs, 291000, 292000 and 293000 respectively.

A. Reason for the Job

(1)Draining to change hydraulic fluid.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 8 in.)
(2)	Reservoir Draining Hose
(3)	Container
Referenced Procedures	
- 12-36-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(Ref. Fig. 302)
(1)Job Set-Up
(a)In flight compartment display warning notices on HYD PWR panel 427VU prohibiting operation of controls and movement of components powered by system whose reservoir is to be drained.
(b)Open right main gear door (Ref. 32-12-11, P. Block 301).
(c)Install access platform.
(d)Depressurize Green, Blue or Yellow reservoir (Ref. 29-14-00, P. Block 301).
(e)Depressurize relevant hydraulic system (Ref. 29-10-00, P. Block 301).
(f)Open, safety and tag the following circuit breakers :
1 For Green reservoir 291000 :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60

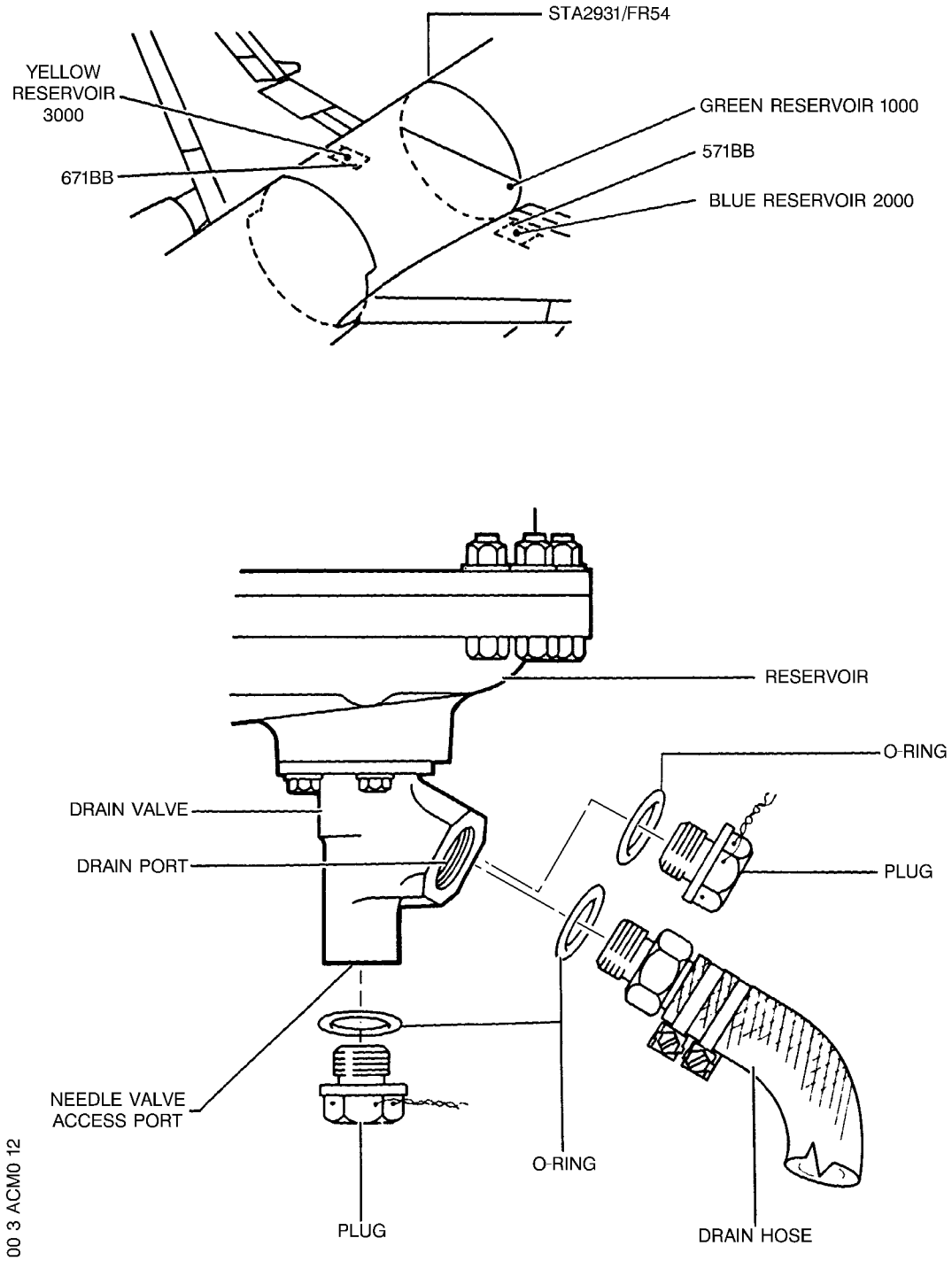
2 For Blue reservoir 292000 :

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/B	1GL	332/U59

3 For Yellow reservoir 293000 :

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(2)Draining
(a)Install container under reservoir to be drained.
(b)Cut and remove lockwire and unscrew needle valve access port plug as well as drain port plug.
(c)Connect one end of drain hose to drain port and insert other end into fluid container of sufficient capacity.
(d)Using a plain screwdriver, unscrew needle valve.
(e)Tighten needle valve when reservoir is completely empty.
(f)Disconnect drain hose.
(g)Install the two plugs coated with hydraulic fluid and fitted with new O-rings, and wirelock.
(3)Close-Up
(a)Remove depressurizing equipment.
(b)Remove all ground handling equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.



Draining of Hydraulic Reservoirs
Figure 302

R

R 6. Check of Clogging Indicators of Return, EDP Case Drain, Ground Servicing and
R HP Delivery Filters not Protruding

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : MAKE CERTAIN THAT RELEVANT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED BEFORE ATTEMPTING MAINTENANCE PROCEDURES ON ENGINE. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

A. Reason for the Job

(1)To check condition of filter element if :

- Filter clogging indicator has operated.
- An anomaly occurs in the operation of an engine-driven pump (EDP).
- A fire shut off valve accidentally closes in flight.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access platform 2.60 m (8 ft. 8 in.)
Referenced Procedures	
- 12-36-29, P. Block 1	Hydraulics
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine) - Servicing
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s)) Opening
- 71-13-00, P. Block 301	Cowl Doors

**ON A/C 001-100,

C. Component Location

ITEM	NAME	PANEL ZONE	ACCESS DOOR
291002	Filter - Reservoir Return, 220 l/ min (58 US gal/min.)	147	
291048	Filter - HP, 140 l/min (37 US US gal/min.)	147	
291049	Filter - HP, 140 l/min (37 US gal/min.)	147	
291079	Filter - HP, 45 l/min (11.9 US gal/min.)	147	
291132	Filter - HP, Reservoir Filling, 6 l/ min (1.5 US gal/min.)	147	
292002	Filter - Reservoir Return, 220 l/ min (58 US gal/min.)	571	571BB
292048	Filter - HP, 140 l/min (37 US gal/min.)	571	
292091	Filter - HP, 90 l/min (23.8 US gal/min.)	571	
293002	Filter - Reservoir Return, 220 l/ min (58 US gal/min)	671	671BB

ITEM	NAME	PANEL ZONE	ACCESS DOOR
293049	Filter - HP, 140 l/min (37 US gal/min.)	148	
293084	Filter - HP, 6 l/min (1.5 US gal/min.)	148	
293090	Filter - HP, 90 l/min (23.8 US gal/min.)	148	
321298	Filter - HP, 45 l/min (11.9 US gal/min.)	147	147SZ
	Filter - Ram Air Turbine		
	Filter - Case Drain, Eng. 1 Green Pump	435	435AL
	Filter - Case Drain, Eng. 2 Green Pump	445	445AL
	Filter - Case Drain, Eng. 1 Blue Pump	435	435AL
	Filter - Case Drain, Eng. 2 Yellow Pump	445	445AL

D. Procedure

**ON A/C 101-200,

C. Component Location

ITEM	NAME	PANEL ZONE	ACCESS DOOR
291002	Filter - Reservoir Return, 220 l/min (58 US gal/min.)	147	
291048	Filter - HP, 140 l/min (37 US US gal/min.)	147	
291049	Filter - HP, 140 l/min (37 US gal/min.)	147	
291079	Filter - HP, 45 l/min (11.9 US gal/min.)	147	
291132	Filter - HP, Reservoir Filling, 6 l/min (1.5 US gal/min.)	147	
292002	Filter - Reservoir Return, 220 l/min (58 US gal/min.)	571	571BB
292048	Filter - HP, 140 l/min (37 US gal/min.)	571	
292091	Filter - HP, 90 l/min (23.8 US gal/min.)	571	
293002	Filter - Reservoir Return, 220 l/min (58 US gal/min)	671	671BB
293049	Filter - HP, 140 l/min (37 US gal/min.)	148	
293084	Filter - HP, 6 l/min (1.5 US gal/min.)	148	

ITEM	NAME	PANEL ZONE	ACCESS DOOR
293090	Filter - HP, 90 l/min (23.8 US gal/min.)	148	
321298	Filter - HP, 45 l/min (11.9 US gal/min.)	147	147SZ
	Filter - Case Drain, Eng. 1 Green Pump	452	452ER
	Filter - Case Drain, Eng. 2 Green Pump	462	462ER
	Filter - Case Drain, Eng. 1 Blue Pump	452	452ER
	Filter - Case Drain, Eng. 2 Yellow Pump	462	462ER

D. Procedure

**ON A/C ALL

(Ref. Fig. 303)

(1)Job Set-Up

(a)For checks in hydraulics compartment :
- Open left main landing gear door (Ref. 32-12-11, P. Block 301).

(b)For check in ram air turbine area :
- Perform RAT extension (Ref. 29-25-00, P. Block 301).

(c)For checks on engines :
- Open engine cowl doors (Ref. 71-13-00, P. Block 301)

(d)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1 & 2/START/CTL &/WARN	1KG	335/R68
133VU	ENG 1 & 2/IGNITION/SYS A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENG 1/REVERSE/CTL	1KM	332/U69
133VU	ENG 2/REVERSE/CTL	2KM	331/V74

(2)Checks

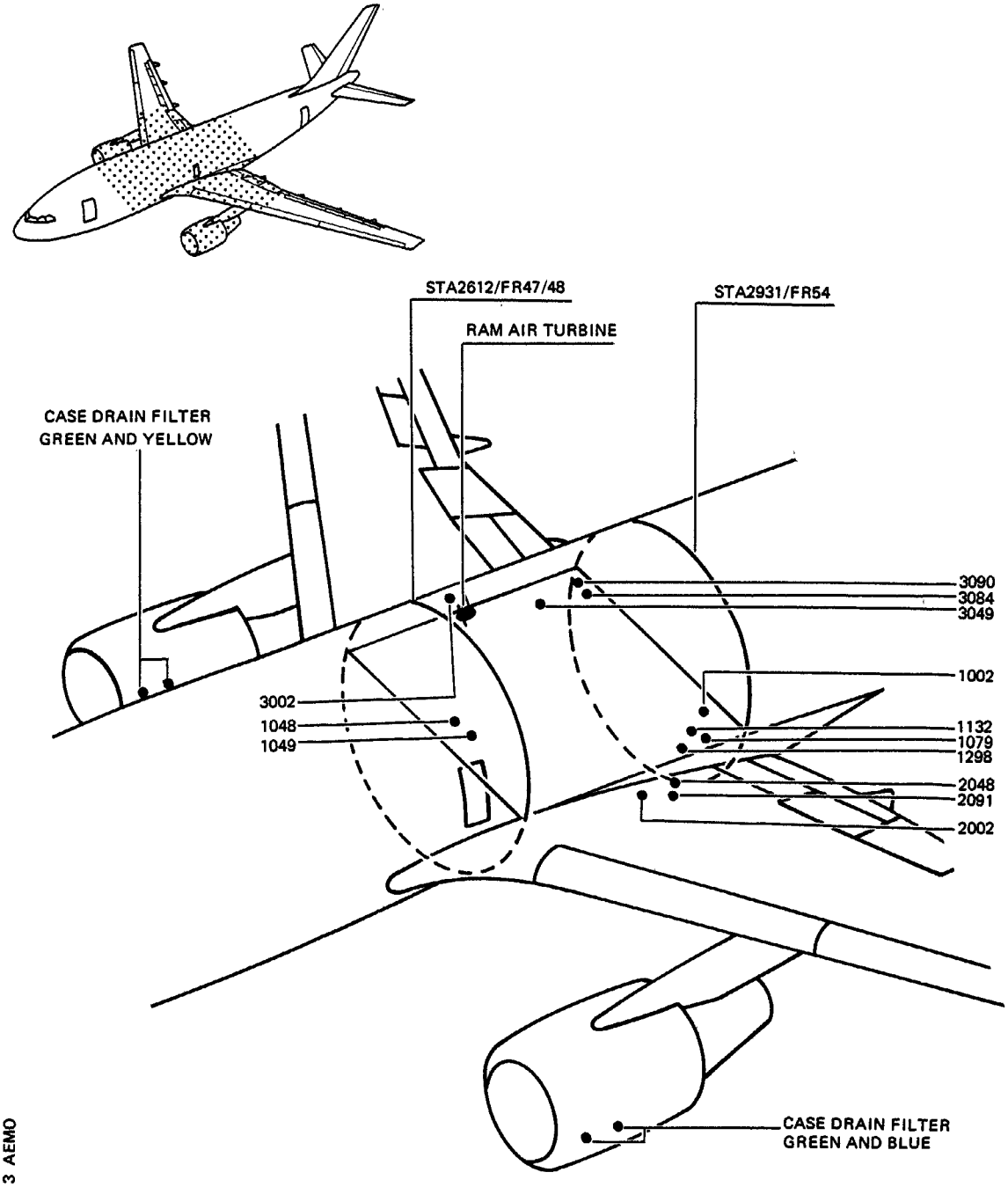
The removal/installation procedure for each filter element is described in the relevant ATA section (Ref. P. Block 301 - Servicing).

(a)Check of clogging indicators

- indicator in = filter in good condition
- indicator protruding = filter clogged.

If an indicator is protruding (color red or blue according to the type of filter) it is necessary to check the filter element in order to determine the causes of contamination and also whether it is necessary to reclaim system fluid totally or partially. (Ref. 12-36-29, P. Block 1).

(b)HP and case drain filters must always be removed in the case of inadvertent or accidental closure of a fire shut off valve in flight



Location of Filters
Figure 303

(more than 5 min.) or in the event of an anomaly occurring in engine pump operation (Ref. para.11).

NOTE : If metallic particles are detected after the incidents quoted above, the engine pump must be replaced. Depending on the results of checks of other filters, the hydraulic fluid may also have to be reclaimed completely or partially. (Ref. 12-36-29, P. Block 1)

(3)Close-Up

(a)Close engine cowl doors (Ref. 71-13-00, P. Block 301).

(b)Close left main landing gear door, (Ref. 32-12-11, P. Block 301).

(c)Perform RAT retraction (Ref. 29-25-00, P. Block 301)

(d)Remove safety clips and tags, and close the following circuit breakers 1KG, 1JH, 2JH, 1KM and 2KM.

(e)Remove access platforms.

7. Cross References

ITEM	DESIGNATION
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-14-29, P. Block 1	Hydraulic System Accumulators
- 12-32-29, P. Block 1	Hydraulic Fluid
- 12-36-29, P. Block 1	Hydraulics

8. Torque Values for Pressure Switches and Transmitters Mounted on Pressure Manifolds

A. Green Pressure Manifold, Item 291060

ITEM	DESIGNATION	TORQUE m.daN	VALUE lbf./ft.
30WW	LOW PRESSURE SWITCH	0.090 to 0.135	0.66 to 0.99
17WV	PRESSURE TRANSMITTER	0.70 to 0.80	5.16 to 5.90
16GE	LOW PRESSURE SWITCH	0.090 to 0.135	0.66 to 0.99

B. Not Applicable

C. Blue Pressure Manifold, Item 292060

ITEM	DESIGNATION	TORQUE m.daN	VALUE lbf./ft.
29WW	LOW PRESSURE SWITCH	0.090 to 0.135	0.66 to 0.99
15WV	PRESSURE TRANSMITTER	0.70 to 0.80	5.16 to 5.90

D. Not Applicable

E. Yellow Pressure Manifold, Item 293060

ITEM	DESIGNATION	TORQUE m.daN	VALUE lbf./ft.
31WW	LOW PRESSURE SWITCH	0.090 to 0.135	0.66 to 0.99
16WV	PRESSURE TRANSMITTER	0.70 to 0.80	5.16 to 5.90
74GG	PRESSURE TRANSMITTER	0.70 to 0.80	5.16 to 5.90

F. Not Applicable

G. Servocontrol Green Pressure Manifold, item 291010

ITEM	DESIGNATION	TORQUE m.daN	VALUE lbf./ft.
19CB	LOW PRESSURE SWITCH	0.090 to 0.135	0.66 to 0.99

H. Servocontrol Blue Pressure Manifold, Item 292010

ITEM	DESIGNATION	TORQUE m.daN	VALUE lbf./ft.
17CB	LOW PRESSURE SWITCH	0.090 to 0.135	0.66 to 0.99

J. Servocontrol Yellow Pressure Manifold, Item 293010

ITEM	DESIGNATION	TORQUE m.daN	VALUE lbf./ft.
18CB	LOW PRESSURE SWITCH	0.090 to 0.135	0.66 to 0.99

K. Hydraulic Reservoirs

ITEM	DESIGNATION	TORQUE m.daN	VALUE lbf./ft.
292000	Blue hydraulic reservoir pressure switch, item 3GH	1.49	1.09
293000	Yellow hydraulic reservoir pressure switch, item 2GH	1.49	1.09
291000	Green hydraulic reservoir pressure switch, item 6GH	1.49	1.09

9. Torque Value for Both Extractor Plug Models Made of Aluminium Alloy and Installed on Hydraulic Manifolds

A. Model Installed on Manifolds, Items 291060, 293060, 291004, 292004 and 293004

DESIGNATION	THREAD	TORQUE m.daN	VALUE lbf./ft.
EXTRACTOR PLUG	1"1/16-12UN-3A	7.3 to 7.4	53.87 to 54.61

B. Model Installed on Manifolds, Items 291010, 292010, 293010, 291004, 291004, 292004, 292060 and 293060

DESIGNATION	THREAD	TORQUE m.daN	VALUE lbf./ft.
EXTRACTOR PLUG	1"7/8-12UN-3A	9.7 to 10.7	71.54 to 78.92

10. Torque Value for Restrictors Installed on Manifolds

A. Model Installed on Manifolds, Items 291702 and 291703

DESIGNATION	THREAD	TORQUE m.daN	VALUE lbf./ft.
RESTRICTOR		12.9 to 14.2	95.1 to 104.7

11. Check of Green Hydraulic System after Operation of Engine Pump in Possible Starvation or Cavitation Condition

A. Reason for the Job

Perform this check if Green hydraulic engine pump(s) has (have) operated for more than 10 mn in possible starvation or cavitation condition.
There are two procedures :
- one if there is a fire shut-off valve closure and pump damage (Ref. Para. D.(1))
- one if there is a low air pressure (Ref. Para. D.(2)).

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-36-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 601	Hydraulic Power - General
- 29-11-15, P. Block 301	Reservoir Return Filter - Servicing
- 29-11-32, P. Block 401	Engine Pump - Removal/Installation
- 29-11-36, P. Block 301	Engine-Driven Pump Case Drain Filters-Servicing
- 29-11-42, P. Block 301	Pump Delivery Filter 291048-291049 - Servicing
- 29-14-00, P. Block 601	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - Servicing (Ground Door(s) Opening)
- 71-13-00, P. Block 301	Cowl Doors

C. Job Set-Up

(1) Starvation condition :

A starvation condition of Green hydraulic engine pump(s) is possible when pump(s) operates with :
- engine 1 pump fire valve closed manually (on overhead panel if you pull **ENG 1 FIRE** handle),

or
- engine 2 pump fire valve closed manually (on overhead panel if you pull **ENG 2 FIRE** handle),

(2) Cavitation condition

A cavitation condition of Green hydraulic engine pump(s) is possible when pump(s) operates with :
RSVR LO AIR PRESS indication related to Green hydraulic reservoir in view on left **ECAM** display unit,
or
on **HYD PWR** panel 427VU :
- **LO PR** legend of **PUMPS/ENG 1** pushbutton switches on
- **LO PR** legend of **PUMPS/ENG 2** pushbutton switches on
- **LO PR** legend of **PUMPS/ENG 1&2** pushbutton switches on

or
possible internal damage of Green engine pump(s).

(3) Engine pump(s) running without starvation or cavitation condition :

There is no starvation or cavitation condition for pump operation if, on HYD PWR panel 427VU :
- PUMPS/ENG 1 or/and PUMPS/ENG 2 pushbutton switch(es) is(are) released (OFF legend on).

On condition that related fire valve is open and that there is no low level. In this situation the pump is normally supplied with hydraulic fluid and stays lubricated.

(4)Get access
(a)Open fan cowl doors (Ref. 71-13-00, P. Block 301) :
- open door 435AL to get access to Green pump located on Engine 1,
- open door 445AL to get access to Green pump located on Engine 2.

(b)Open MLG doors (Ref. 32-12-11, P. Block 301).

D. Procedure
(1)Inspection of Green hydraulic system if fire valve(s) is(are) closed manually or if pump(s) is(are) damaged (Green engine pump(s) low pressure).
(a)If necessary, check Green hydraulic system for external leakage (Ref. 29-00-00, P. Block 601).
(b)Replace engine pump(s) (Ref. 29-11-32, P. Block 401).
(c)Check clogging indicators of Green hydraulic case drain filters (Ref. Para. 6).
1 If red indicator is out :
- replace case drain filter element (Ref. 29-11-36, P. Block 301),
- fill Green reservoir (Ref. 12-12-29, P. Block 1),
- if necessary, on overhead panel, push ENG 1(2) FIRE handle to open fire valve(s),
- check reservoir fluid level, add fluid, if necessary (Ref. 12-12-29, P. Block 1),
- perform test of engine pump (Ref. 29-11-32, P. Block 401),
- replace case drain filter element (Ref. 29-11-36, P. Block 301).

2 If red indicator is not out :
- perform test of engine pump (Ref. 29-11-32, P. Block 401),
- check red indicator again, if it is out, replace case drain filter element and test Green engine pump.

(d)Check clogging indicators of Green delivery filters (291048, 291049) and return filter (291002).
1 If one red indicator is out :
- replace related filter element :
  . for delivery filters (291048-291049) (Ref. 29-11-42, P. Block 301),
  . for return filter (291002) (Ref. 29-11-15, P. Block 301).
- flush Green system (Ref. 12-36-29, P. Block 1).

2 If red indicators are not out :
- perform operational test of Green engine pump (Ref. 29-11-32, P. Block 401),
- check clogging indicator of case drain filters and replace if necessary,
- replace delivery filters (291048/291049) (Ref. 29-11-42, P. Block 301),
- replace return filter (291002) (Ref. 29-11-15, P. Block 301).

(2)Inspection of Green hydraulic system if pump operates with low air pressure or low level.

CAUTION : IF THE ENGINE 1(2) PUMP HAS OPERATED FOR MORE THAN 10 MIN. IN STARVATION/CAVITATION CONDITION, PERFORM THE TEST OF THE ENGINE 1(2) PUMP FOR BOTH ENGINE 1(2) PUMPS.

(a)Check air pressure in Green reservoir (Ref. 29-14-00, P. Block 601).
- on right ECAM display unit, on HYD page, monitor position of index.

(b)If fluid index is above minimum gaugeable level :

1 Check hydraulic system for external leakage (Ref. 29-00-00, P. Block 601).

2 Fill Green reservoir (Ref. 12-12-29, P. Block 1).

3 Check clogging indicators of :
- case drain filters (Ref. 29-11-36, P. Block 301),
- return filter (Ref. 29-11-15, P. Block 301),
- delivery filters (Ref. 29-11-42, P. Block 301).

4 If one red indicator is out, replace related filter element :
- for case drain filters (Ref. 29-11-36, P. Block 301),
- for return filter (Ref. 29-11-15, P. Block 301),
- for delivery filters (Ref. 29-11-42, P. Block 301).

If necessary, push ENG 1(2) FIRE handle to open fire valve again.
Check reservoir fluid level, add fluid if necessary.
Flush Green hydraulic system (Ref. 12-36-29, P. Block 1).

5 If red indicators are not out :

R - perform test of the two engine pumps (Ref. 29-11-32, P. Block 401)
R . if each pump supplies 3000PSI, check clogging indicators of case drain filters, return filter and HP filters.
R . if one pump does not supply nominal pressure :
* replace engine pump (Ref. 29-11-32, P. Block 401)
* perform actions listed in Para. (c)3.

(c)If fluid level index is below minimum gaugeable level :

1 Check hydraulic system for external leakage (Ref. 29-00-00, P. Block 601).

R 2 Replace the two engine pumps (Ref. 29-11-32, P. Block 401).

3 Check clogging indicators of Green hydraulic case drain filters :
- if red indicator is out :
. replace case drain filter element (Ref. 29-11-36, P. Block 301)
. fill Green reservoir (Ref. 12-12-29, P. Block 1)
. if necessary push ENG 1(2) FIRE handle to open fire valve again
. check reservoir fluid level, add fluid if necessary (Ref. 12-12-29, P. Block 1)
. perform test of engine pump(s) (Ref. 29-11-32, P. Block 401).
. replace case drain filter element (Ref. 29-11-36, P. Block 301)
- if red indicator is not out :
. perform test of engine pump(s) (Ref. 29-11-32, P. Block 401)
. check red indicator and if it is out replace case drain filter element and perform test of engine pump(s) (Ref. 29-11-36, P. Block 301) and (Ref. 29-11-32, P. Block 401)
. check clogging indicators of delivery filters and return filter (Ref. 29-11-42, P. Block 301) and (Ref. 29-11-15, P. Block 301)
* if one red indicator is out :

** replace related filter
** flush Green system (Ref. 12-32-29, P. Block 1)
* if red indicators are not out :
** perform test of engine pump(s) (Ref. 29-11-32, P. Block 401)
** check clogging indicators of case drain filters and replace if necessary (Ref. 29-11-36, P. Block 301)
** replace delivery filters and return filter (Ref. 29-11-42, P. Block 301) and (Ref. 29-11-15, P. Block 301).

E. Close-Up
(1)Close fan cowl doors (Ref. 71-13-00, P. Block 301).
(a)Close door 435AL.
(b)Close door 445AL.
(2)Close MLG doors (Ref. 32-12-11, P. Block 201).

12.Check of Blue Hydraulic System after Operation of Engine Pump in Possible Starvation or Cavitation Condition

A. Reason for the Job
Perform this check if Blue hydraulic engine pump has operated for more than 10 mn in possible starvation or cavitation condition.
There are two procedures :
- one if there is a fire shut-off valve closure and pump damage (Ref. Para. D.(1))
- one if there is a low air pressure (Ref. Para. D.(2)).

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-36-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 601	Hydraulic Power - General
- 29-11-36, P. Block 301	Engine-Driven Pump Case Drain Filters-Servicing
- 29-12-15, P. Block 301	Reservoir Return Filter - Servicing
- 29-12-32, P. Block 401	Engine Pump - Removal/Installation
- 29-12-52, P. Block 301	Pump Delivery Filter 292048-Servicing
- 29-14-00, P. Block 601	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - Servicing (Ground Door(s) Opening)
- 71-13-00, P. Block 301	Cowl Doors

C. Job Set-Up
(1)Starvation condition :
Starvation condition of Blue hydraulic engine pump is possible when pump operates with :
- engine 1 pump fire valve closed manually (on overhead panel if you pull ENG 1 FIRE handle),
(2)Cavitation condition
A cavitation condition of Blue hydraulic engine pump is possible when

pump operates with :
RSVR LO AIR PRESS indication related to Blue hydraulic reservoir in view on left **ECAM** display unit,
or
on **HYD PWR** panel **427VU**, **LO PR** legend of **PUMPS/ENG 1** pushbutton switch on
or
possible internal damage of Blue engine pump.

(3)Engine pump running without starvation or cavitation condition :
There is no starvation or cavitation condition for pump operation if, on **HYD PWP** panel **427VU** :
- **PUMPS/ENG 1** pushbutton switch is released (**OFF** legend on).
On condition that related fire valve is open and that there is no low level. In this situation the pump is normally supplied with hydraulic fluid and stays lubricated.

(2)Get access.

(a)Open fan cowl doors (Ref. 71-13-00, P. Block 301) :
- open door **435AL** to get access to Blue pump located on Engine 1.

(b)Open **MLG** doors (Ref. 32-12-11, P. Block 301).

D. Procedure

(1)Inspection of Blue hydraulic system if fire valve is closed manually or if pump is damaged (Blue engine pump low pressure).

(a)If necessary, check Blue hydraulic system for external leakage (Ref. 29-00-00, P. Block 601).

(b)Replace engine pump (Ref. 29-12-32, P. Block 401).

(c)Check clogging indicator of Blue hydraulic case drain filter (Ref. Para. 6).

1 If red indicator is out :
- replace case drain filter element (Ref. 29-11-36, P. Block 301),
- fill Blue reservoir (Ref. 12-12-29, P. Block 1),
- if necessary, on overhead panel, push **ENG 1 FIRE** handle to open fire valve,
- check reservoir fluid level, add fluid, if necessary (Ref. 12-12-29, P. Block 1),
- perform test of engine pump (Ref. 29-12-32, P. Block 401),
- replace case drain filter element (Ref. 29-11-36, P. Block 301).

2 If red indicator is not out :
- perform test of engine pump (Ref. 29-12-32, P. Block 401),
- check red indicator again, if it is out, replace case drain filter element and test Blue engine pump.

(d)Check clogging indicators of Blue delivery filter (292048) and return filter (292002).

1 If one red indicator is out :
- replace related filter element :
  . for delivery filter (292048) (Ref. 29-12-52, P. Block 301),
  . for return filter (292002) (Ref. 29-12-15, P. Block 301).
- flush Blue system (Ref. 12-36-29, P. Block 1).

2 If red indicators are not out :
- perform operational test of Blue engine pump (Ref. 29-12-32, P. Block 401),

- check clogging indicator of case drain filter and replace if necessary,
- replace delivery filter (292048) (Ref. 29-12-52, P. Block 301),
- replace return filter (292002) (Ref. 29-12-15, P. Block 301).

(2)Inspection of Blue hydraulic system if pump operates with low air pressure or low level.

(a)Check air pressure in Blue reservoir (Ref. 29-14-00, P. Block 601).
On right ECAM display unit, on HYD page, monitor position of index.

(b)If fluid index is above minimum gaugeable level :

1 Check hydraulic system for external leakage (Ref. 29-00-00, P. Block 601).

2 Fill Blue reservoir (Ref. 12-12-29, P. Block 1).

3 Check clogging indicators of :
- case drain filter (Ref. 29-11-36, P. Block 301),
- return filter (Ref. 29-12-15, P. Block 301),
- delivery filter (Ref. 29-12-52, P. Block 301).

4 If one red indicator is out, replace related filter element :
- for case drain filter (Ref. 29-11-36, P. Block 301),
- for return filter (Ref. 29-12-15, P. Block 301),
- for delivery filter (Ref. 29-12-52, P. Block 301).

If necessary, push ENG 1 FIRE handle to open fire valve again.
Check reservoir fluid level, add fluid if necessary.
Flush the Blue hydraulic system (Ref. 12-36-29, P. Block 1).

5 If red indicators are not out :
- perform test of engine pump (Ref. 29-12-32, P. Block 401).
  . if pump supplies 3000 PSI, check clogging indicators of case drain filter, return filter and delivery filter
  . if pump does not supply nominal pressure :
    * replace engine pump (Ref. 29-12-32, P. Block 401)
    * perform actions listed in Para. (c)3.

(c)If fluid level index is below minimum gaugeable level :

1 Check hydraulic system for external leakage (Ref. 29-00-00, P. Block 601).

2 Replace engine pump (Ref. 29-12-32, P. Block 401).

3 Check clogging indicator of Blue hydraulic case drain filter :
- if red indicator is out :
  . replace case drain filter element (Ref. 29-11-36, P. Block 301)
  . fill Blue reservoir (Ref. 12-12-29, P. Block 1)
  . if necessary, push ENG 1 FIRE handle to open fire valve again
  . check reservoir fluid level, add fluid if necessary (Ref. 12-12-29, P. Block 1)
  . perform test of engine pump (Ref. 29-12-32, P. Block 401)
  . replace case drain filter element (Ref. 29-11-36, P. Block 301).
- if red indicator is not out :
  . perform test of engine pump (Ref. 29-12-32, P. Block 401)
  . check red indicator and if it is out, replace case drain filter element and perform test of engine pump (Ref. 29-11-36, P. Block 301) and (Ref. 29-12-32, P. Block 401)
  . check clogging indicators of delivery filter and return filter (Ref. 29-12-52, P. Block 301, Ref. 29-12-15, P. Block 301)
    * if one red indicator is out :

** replace related filter
** flush Blue system (Ref. 12-32-29, P. Block 1)
* if red indicators are not out :
** perform test of engine pump (Ref. 29-12-32, P. Block 401)
** check clogging indicator of case drain filter and replace if necessary (Ref. 29-11-36, P. Block 301)
** replace delivery filter and return filter (Ref. 29-12-52, P. Block 301) and (Ref. 29-12-15, P. Block 301).

E. Close-Up
(1)Close fan cowl doors (Ref. 71-13-00, P. Block 301).
(a)Close door 435AL.
(2)Close MLG doors (Ref. 32-12-11, P. Block 301).

13.Check of Yellow Hydraulic System after Operation of Engine Pump in Possible Starvation or Cavitation Condition

A. Reason for the Job
Perform this check if Yellow hydraulic engine pump has operated for more than 10 mn in possible starvation or cavitation condition.
There are two procedures :
- one if there is a fire shut-off valve closure or pump damage (Ref. Para. D.(1))
- one if there is a low air pressure (Ref. Para. D.(2)).

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-36-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 601	Hydraulic Power - General
- 29-11-36, P. Block 301	Engine-Driven Pump Case Drain Filters-Servicing
- 29-13-15, P. Block 301	Reservoir Return Filter - Servicings
- 29-13-32, P. Block 401	Engine Pump - Removal/Installation
- 29-13-54, P. Block 301	Pump Delivery Filter 293049-Servicing
- 29-14-00, P. Block 601	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - Servicing (Ground Door(s) Opening)
- 71-13-00, P. Block 301	Cowl Doors

C. Job Set-Up
(1)Starvation condition :
A starvation condition of Yellow hydraulic engine pump is possible when pump operates with :
- engine 2 pump fire valve automatically closed because of Yellow low level
or
- engine 2 pump fire valve closed manually (on overhead panel if you pull ENG 2 FIRE handle),
(2)Cavitation condition

A cavitation condition of Yellow hydraulic engine pump is possible when pump operates with :
RSVR LO AIR PRESS indication related to Yellow hydraulic reservoir in view on left **ECAM** display unit,
or
on **HYD PWR** panel 427VU, **LO PR** legend of **PUMPS/ENG 2** pushbutton switch on
or
possible internal damage of Yellow engine pump.

(3)Engine pump running without starvation a cavitation condition :
There is no starvation or cavitation condition for pump operation if, on **HYD PWR** panel 427VU :
- **PUMPS/ENG 2** pushbutton switch is released (**OFF** legend on).
On condition that related fire valve is open and that there is no low level. In this situation the pump is normally supplied with hydraulic fluid and stays lubricated.

(4)Get access.
(a)Open fan cowl doors (Ref. 71-13-00, P. Block 301) :
- open door 445AL to get access to Yellow pump located on Engine 2.

(b)Open MLG doors (Ref. 32-12-11, P. Block 301).

D. Procedure

(1)Inspection of Yellow hydraulic system if fire valve is closed automatically (because of Yellow reservoir low level) or manually or if pump is damaged (Yellow engine pump low pressure).
(a)If necessary, check Yellow hydraulic system for external leakage (Ref. 29-00-00, P. Block 601).
(b)Replace engine pump (Ref. 29-13-32, P. Block 401).
(c)Check clogging indicator of Yellow hydraulic case drain filter (Ref. Para. 6).
1 If red indicator is out :
- replace case drain filter element (Ref. 29-11-36, P. Block 301),
- fill Yellow reservoir (Ref. 12-12-29, P. Block 1),
- after 30s, on **HYD PWR** section of panel 471VU, make sure that **OPEN** legend of **FIRE VALVES/Y** annunciator is on.
- perform test of engine pump (Ref. 29-13-32, P. Block 401),
- replace case drain filter element (Ref. 29-11-36, P. Block 301).

2 If red indicator is not out :
- perform test of engine pump (Ref. 29-13-32, P. Block 401),
- check red indicator again, if it is out, replace case drain filter element and test Yellow engine pump.

(d)Check clogging indicators of Yellow delivery filter (293049) and return filter (293002).
1 If one red indicator is out :
- replace related filter element :
. for delivery filter (293049) (Ref. 29-13-54, P. Block 301),
. for return filter (293002) (Ref. 29-13-15, P. Block 301).
- flush Yellow system (Ref. 12-36-29, P. Block 1).

2 If red indicators are not out :
- perform operational test of Yellow engine pump (Ref. 29-13-32, P. Block 401),
- check clogging indicator of case drain filter and replace if

necessary,
- replace delivery filter (293049) (Ref. 29-13-54, P. Block 301),
- replace return filter (293002) (Ref. 29-13-15, P. Block 301).

(2)Inspection of Yellow hydraulic system if pump operates with low air pressure.
(a)Check air pressure in Yellow reservoir (Ref. 29-14-00, P. Block 601).
(b)Check clogging indicators of :
- delivery filter (293049)
- return filter (293002).

1 If one red indicator is out :
- replace engine pump (Ref. 29-13-32, P. Block 401),
- replace defective filter element,
. for delivery filter (Ref. 29-13-54, P. Block 301),
. case drain filter (Ref. 29-11-36, P. Block 301),
. return filter (Ref. 29-13-15, P. Block 301),
- flush Yellow hydraulic system (Ref. 12-36-29, P. Block 1).

2 If red indicators are not out :
- perform test of engine pump (Ref. 29-13-32, P. Block 401)
. if pump supplies 3000 PSI :
* check clogging indicators given in Para. (2)(b).
. if pump does not supply nominal pressure :
* perform actions listed in Para. (2)(b)1.

E. Close-Up
(1)Close fan cowl doors (Ref. 71-13-00, P. Block 301).
(a)Close door 445AL.
(2)Close MLG doors (Ref. 32-12-11, P. Block 301).

14.Check after Hydraulic System Operation in Actual Overheat Condition.
- Sample the fluid involved (Ref. 12-32-29, P. Block 1).
- Check that fluid properties are within in-service limits (Ref. 12-32-29, P. Block 1).

If sample analysis reveals that hydraulic fluid properties are beyond in-service limits, the hydraulic fluid shall be replaced (Ref. 12-36-29, P. Block 1, Replacement of Hydraulic Fluid).

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

The following instructions should be applied when maintenance operations are carried out on the aircraft and more specially during the Removal/Installation of equipment :

1 - General rules,
2 - Component replacement,
3 - Cleaning/Check
4 - Final check,
5 - Torque values,
6 - Hydraulic connections,

1. General Rules

Accomplishment of maintenance operations provides an opportunity of performing at the same time preventive maintenance, in the form of a localized check in the working areas concerned.
Each time maintenance is carried out on a single component or on several components in the same area, the adjacent zone shall be cleaned and then carefully checked.
A detailed final check must be carried out when the operations are finished and before the doors or access panels are closed.
Prior to performing any maintenance on the hydraulic system, personnel should observe and thoroughly understand the following precautions. Careful adherence to the instructions will aid in maintaining a functional and trouble-free system.

CAUTION : HYDRAULIC FLUID WILL ATTACK A WIDE RANGE OF MATERIALS, INCLUDING RUBBER, COPPER, TITANIUM, VARIOUS PLASTICS, AND PAINTS.

Long exposure to hydraulic fluid can cause skin dehydration and chapping.

WARNING : BEFORE PROCEEDING WITH ANY MAINTENANCE WORK ON THE YELLOW HYDRAULIC SYSTEM WHICH WILL RESULT IN DISCONNECTING A HYDRAULIC LINE, CHECK CARGO DOORS. IF DOORS CAN NOT BE CLOSED, TAG DOORS AND CONTROLS "DO NOT CLOSE". AFTER WORK IS ACCOMPLISHED, CARGO DOOR ACTUATORS MUST BE BLED PRIOR TO CLOSING DOOR (REF. 52-33-00, PAGE BLOCK 301).

2. Component Replacement

A. Replacement

WARNING : AFTER REPLACEMENT OF COMPONENTS ON AN ASSEMBLY, ALL HYDRAULIC SYSTEMS CONCERNED MUST BE PRESSURIZED FOR EXTERNAL LEAKAGE CHECK.

When a bare replacement component is delivered and must be equipped with parts retained from the removed component, the following procedure must be applied :

(1)Always check position and angle of fittings removed from components to ensure correct positioning and alignment on replacement components. Clean the removed part, check it for correct condition and test it if necessary.

(2)When washing metal parts before assembly, use only solvent (Material No. 11-003 or 11-006) and make certain that all traces of the solvent are removed before assembly.

(3)Use only approved hydraulic fluids for flushing or testing hydraulic components.

(4)Replace all seals, safetying devices etc.
Do not unpack hydraulic system O-rings and seals unless required.

(5)When assembling hydraulic system O-rings and seals, use only approved lubricant or hydraulic fluid.
Always lubricate O-rings and seals immediately before installation.
CAUTION : TAKE SPECIAL CARE TO AVOID CONTAMINATION OF O-RINGS AFTER LUBRICATION.

R (6)When removing a component, make certain that related hydraulic system is depressurized (Ref. 29-10-00, P. Block 301) and that related hydraulic reservoir is depressurized (Ref. 29-14-00, P. Block 301).

R (7)Install the component, taking great care to position it in exactly the same manner and direction as previously noted. In particular, check, during the TEST stage of maintenance operations, that parts taken from a removed component are able to operate correctly. If necessary, loosen the clamp block(s) to correctly align the pipes.

B. General Hydraulic System Bleeding Procedure

WARNING : BLEED INVOLVED HYDRAULIC SYSTEMS EVERYTIME AIR/GAS HAS HAD THE POSSIBILITY OF BEING INTRODUCED IN PRESSURE SIDE OF SYSTEM (LINE OR COMPONENT REPLACEMENT, INCLUDING FILTER ELEMENT).
BLEEDING IS NOT NECESSARY WHEN THE CHANGED COMPONENT IS ON RETURN SIDE OF SYSTEM (CASE DRAIN FILTER, LINE OR COMPONENT).

WARNING : IN CASE OF HYDRAULIC FLUID LOSS, WHICH TRIGGERED THE LOW LEVEL WARNING OF THE ASSOCIATED SYSTEM RESERVOIR, IT IS ADVISABLE TO PERFORM FIRST THE BLEEDING OF RELEVANT ENGINE DRIVEN PUMP SUCTION LINE. (REF. 29-11-32, P. BLOCK 401, BLEEDING PROCEDURE PARAGRAPH).

(1)Perform following operations to bleed systems concerned during pressurization of hydraulic systems.
NOTE : After bleeding procedure, check level of hydraulic reservoir and top up if required (Ref. 12-12-29, P. Block 01).

(a)Perform a normal landing gear extension/retraction, (Ref. 32-31-00, P. Block 501).
NOTE : If no jacks are available proceed as follows :
- Carry out restoration of landing gear actuating system (Ref. 32-33-00, P. Block 501).
- Pressurize landing gear retraction system with aircraft on its wheels (Ref. 32-31-00, P. Block 501).
- Bleed affected nose wheel steering system (Ref. 32-51-23,

P. Block 401).
(b)Bleed normal braking system, (Ref. 32-42-00, P. Block 301).
(c)Bleed alternate braking system, (Ref. 32-43-00, P. Block 301).
Check alternate brake pressure on Yellow pressure triple indicator 71GG.
(d)Operate rudder, (Ref. 27-24-11, P. Block 401)
(e)Operate all speed ailerons, (Ref. 27-14-12, P. Block 401)
(f)Operate elevators, (Ref. 27-34-11, P. Block 401)
(g)Operate spoilers (Ref. 27-60-00, P. Block 301)
(h)Operate flaps, (Ref. 27-50-00, P. Block 301)
(j)Operate slats, (Ref. 27-80-00, P. Block 301)
(k)Operate THS (Ref. 27-44-15, P. Block 401)
(l)Reset of various warnings on computers SFCC1, SFCC2, EFCU1, EFCU2, FLC1 and FLC2.

(2)Perform following steps to make certain that there is no air in hydraulic system :
(a)Make certain that air pressure in related hydraulic reservoir is not less than 3.5 bars (50 psi). If necessary, pressurize reservoir (Ref. 29-14-00, P. Block 301).
(b)On related reservoir hydraulic quantity transmitter, record position of fluid level pointer.
(c)Depressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(d)On related hydraulic quantity transmitter, record movement of fluid level pointer.

NOTE : Movement of pointer shows an increase of fluid level in reservoir because of air expansion in system.

(e)If movement of pointer between pressurized and depressurized conditions is more than :
R - 2 liters (0.53 USGal) for Green system,
R - 1.5 liters (0.40 USGal) for Blue system,
R - 1.5 liters (0.40 USGal) for Yellow system,
repeat bleeding procedure until result is satisfactory.

3. Cleaning/Check

WARNING : CLEANING OPERATIONS USING SOLVENTS SHOULD BE PERFORMED IN A WELL VENTILATED ATMOSPHERE. EXERCISE NORMAL SAFETY PRECAUTIONS DURING USE.

A. Cleaning

(1)Cap disconnected electrical connectors (wiring, components), piping or components, as soon as they have been disconnected.

(2)Clear the working area of any items not required (tools, pieces of lockwire, plastic clamps and cloths etc).
(3)Mask lubricated parts of mechanical linkages with vinyl sheet.
(4)Carefully wipe up any liquid which may have been spilled (fluid, fuel, water, etc.).
(5)Clean zone with solvent ; dry with a dry cloth.
(6)Dry with compressed air if necessary.

B. Check

(1)Lines, Ducts

When lines are disconnected and/or components are removed, provide suitable protection to prevent foreign matter from entering lines or components by use of caps or covers.

(a)Hoses

1 Check presence and condition of hose identification placards.
2 Check clamps for correct diameter, satisfactory condition and correct installation. Check that there are no signs of wear on the hoses due to friction (vibrations, pressure surges).
3 Check that hoses are correctly positioned, that there is no friction with other lines, bulkheads or components, and that the hoses are not twisted or cracked.
4 Check for freedom of movement by flexing hoses slightly in the center.
5 Check hose unions for traces of fluid leakage ; also check that any safetying devices are in satisfactory condition and correctly installed.

(b)Pipes

1 Check pipes for deformation, incipient cracks, and evidence of impact, especially at elbows and at pipe-to-component fittings.
2 Check that there is no possibility of metal parts, clamps or rails causing damage to the pipes.
3 Check that there is no leakage at fittings and that the safetying devices are in satisfactory condition and correctly installed.
4 Check that supports, clamp blocks and clamps are correctly tightened. Also check presence and condition of items attaching or separating pipes.

(2)Wiring, Connectors, Components

When electrical connectors are disconnected, install caps or other suitable covers to prevent entry of hydraulic fluid, moisture, and foreign matter.

(a)Wiring

1 Visually check external condition of wiring (insulation, shielding, conduit).

2 Check that coaxial cables are neither in contact with fluid nor damaged.
3 Check that clips and fittings attaching cable bundles to structure are correctly installed.
4 Check that no mechanical component or component part comes into contact, when in motion, with wiring or cable bundles.

(b)Connectors/components

1 Check that electrical connectors are in satisfactory condition and are correctly connected : make certain they are not contaminated by fluid seepage.
2 Check condition of attach fittings and of safety devices. Also check safety devices. Also check for fluid leakage in the areas where hydraulic equipment is installed.
3 On components with an electrical power supply, make certain connectors are correctly safetied.
4 Check condition of fork and eye joints on components actuated mechanically.

(3)Bonding

(a)Check that bonding jumpers are installed, in good condition and correctly secured.
(b)Check that each component, control linkage part, control surface or hinged part is electrically connected to structure through bonding jumpers or connections.
(c)Check presence of protective lacquer on bonding connections. Also check for corrosion.

(4)Safetying

(a)Check on attachments that all safetying devices are correctly installed.
(b)Check that cotter pins are correctly installed on castellated nuts.
(c)Check that lockwire is installed where necessary, and that tension and direction of pull are correct.
(d)Check that tabs of tab washers are firmly folded back.
(e)Check that colored locating marks on nuts are aligned with corresponding marks on structure.

4. Final Check

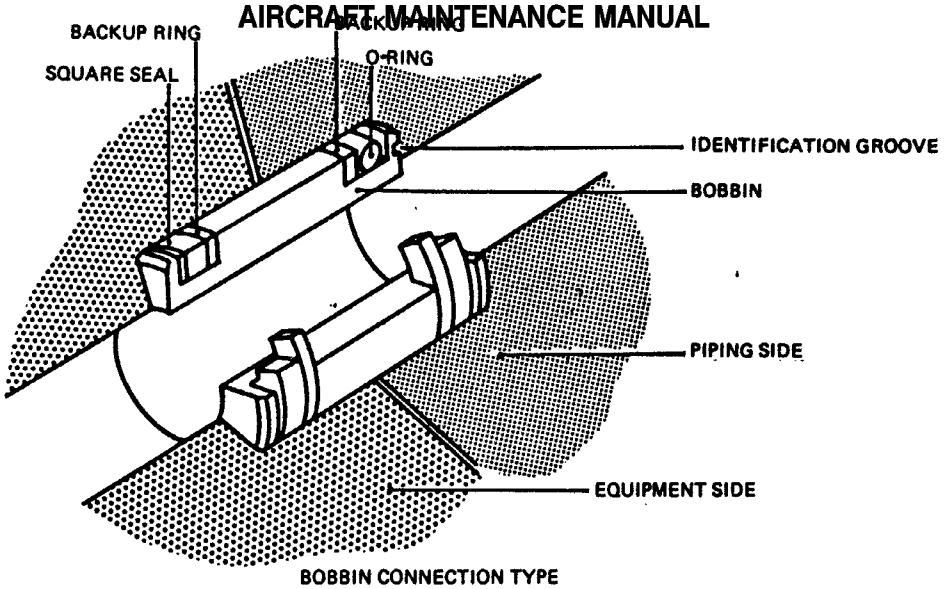
Before closing access doors :
Make certain that working area is clean and that any excess grease, sealant, pieces of lockwire or of plastic clips, cloths etc. have been removed.
Make certain that area is clean and clear of all tools and miscellaneous items of equipment.
Check that components having been completely or partially removed or disconnected in order to gain access to other components, have been correctly reinstalled and reconnected and that their operation has been checked.
In case of any doubt, the maintenance engineer must notify the relevant department.

5. Torque Values

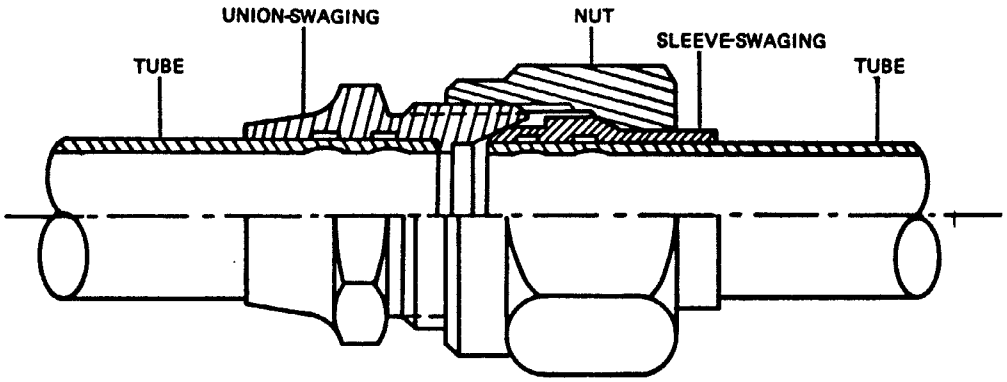
Standard torque values for hydraulic fittings, nuts, jamnuts, etc., are not provided in the system maintenance procedures : only nonstandard torque values are given.

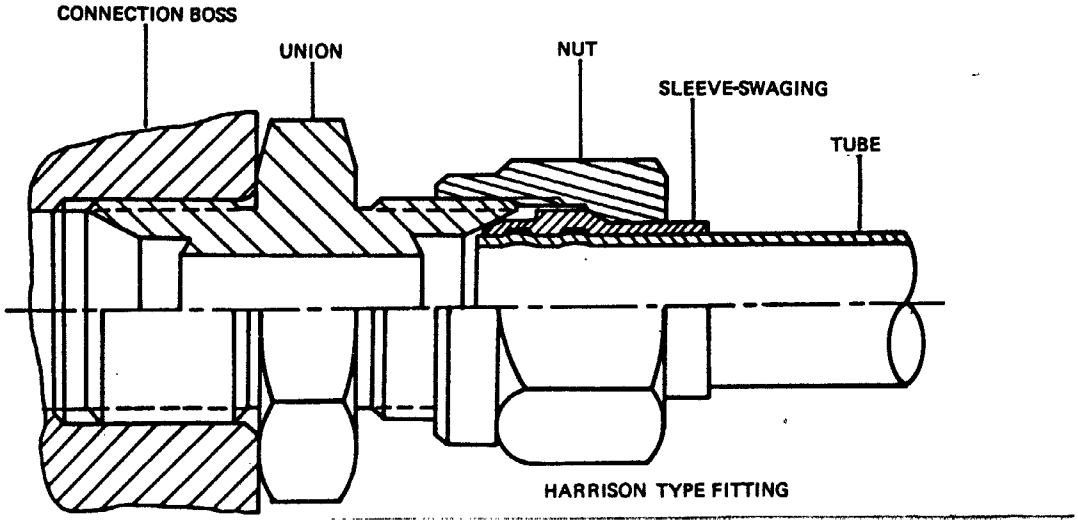
6. Hydraulic Connections
(Ref. Fig. 401)
(Ref. Fig. 402)
The various hydraulic system components and lines are connected by similar-style fittings or by bobbins, depending on the type of connection :
- Line-to-line
- Line-to-line through a pressure bulkhead
- Line-to-component
- Component-to-support component.

CAUTION : IN CASE OF HYDRAULIC LINE REPLACEMENT, MAKE CERTAIN, ON INSTALLATION, THAT ARROW POINTS IN DIRECTION OF HYDRAULIC FLUID FLOW.



BOBBIN CONNECTION TYPE

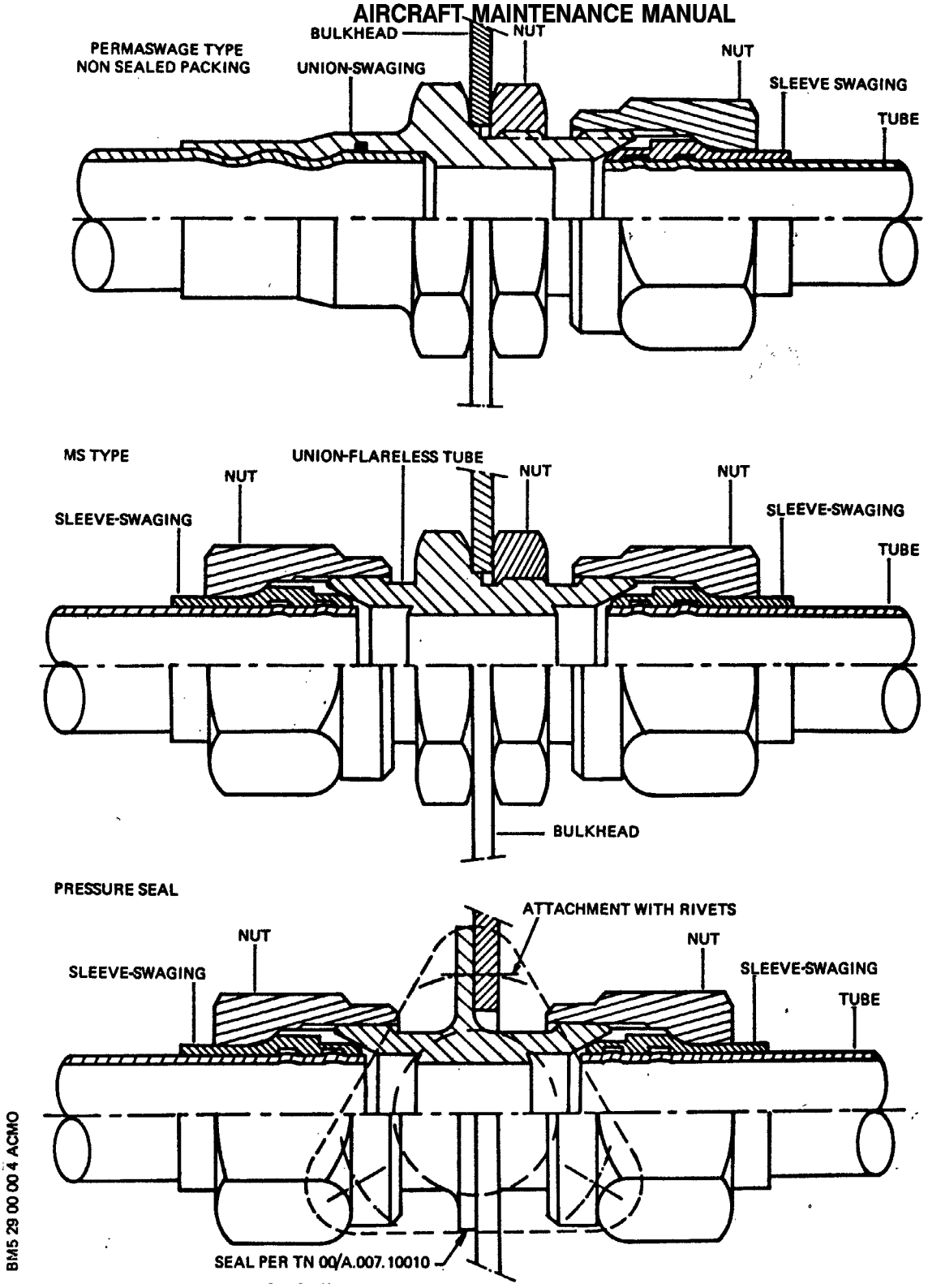




HARRISON TYPE FITTING

BM5 29 00 00 4 AAMO

Hydraulic Connections
Figure 401



Hydraulic Connections
Figure 402

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Check for External Leakage

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT RELEVANT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED BEFORE ATTEMPTING MAINTENANCE PROCEDURES ON ENGINE. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

A. Reason for the Job

(1)To check the hydraulic systems and system components for leakage.

R (2)To check high and low pressure manifolds and ground service panels and
R manifolds for signs of external leakage.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.60 m to 6 m (8 ft. 8 in. to 19 ft. 8 in.)
(2)	Access Platform, 6 m to 12 m (19 ft. 8 in. to 39 ft. 4 in.)

C. Procedure

(1)General leak identification

NOTE : Two procedures for isolating leaks may be considered depending on :
- whether the level of fluid in one of the hydraulic reservoirs is low (high degree of leakage)
- or whether there is localized seepage or traces of hydraulic

fluid.

(a)Low level in a reservoir

1 Look for traces of hydraulic fluid :
- on the ground
- on the lower surface of the wings and stabilizers
- on the landing gear
- in the hydraulics compartment.

Any pools or trickles of fluid are an indication of a faulty component or line. To determine the component which must be replaced, pressurize the associated hydraulic system(s).

(b)Localized seepage or traces of hydraulic fluid.

1 Clean area. Pressurize hydraulic system(s) associated with components or lines to be checked ; sprinkle talcum powder over leakage area, and visually determine faulty item. Check leakage rate (Ref. Para. 1.C.(2).).

2 Check for traces of hydraulic fluid on electrical connectors, clean if necessary.

(2)Maximum permissible leakage
The maximum permissible external leakage on hydraulic components is as follows :

	EQUIPMENT	COMPONENT	NORMAL OPERATION LIMIT	DISPATCH LIMITS TO PREVENT DELAYS
	1-HYDRAULIC PUMPS : ENGINE PUMP, ELECTRIC PUMP, POWER TRANSFER UNIT, RAM AIR TURBINE	STATIC SEALS	NONE	2 DROPS/10 MIN
		STATIC CASING	1 DROP/10 MIN	1 DROP/MIN
		SHAFT SEALS, SYSTEM PRESSURIZED	2 DROPS/MIN EXCEPT RAT:2 DROPS/HOUR	8 DROPS/MIN EXCEPT RAT:6 DROPS/HOUR
R		SHAFT SEALS, IN OPERATION	EDP:10 DROPS/MIN EMP:10 DROPS/MIN PTU:10 DROPS/MIN RAT:1 DROP/MIN	EDP:15 DROPS/MIN EMP:15 DROPS/MIN PTU:15 DROPS/MIN RAT:1 DROP/MIN
R	2-SERVO CONTROL	STATIC SEALS, SYSTEM PRESSURIZED	NONE	2 DROPS/10 MIN
R		DYNAMIC SEALS, SYSTEM PRESSURIZED	1 DROP/10 MIN	30 DROPS/MIN
R R		DYNAMIC SEALS, SYSTEM IN OPERATION	1 DROP/10 CYCLES (*1)	15 DROPS/ 10 CYCLES (*1)
	3-ACTUATORS: LANDING GEAR LANDING GEAR DOORS, CARGO DOORS, ...	STATIC SEALS	NONE	2 DROPS/10 MIN
		ROD SEALS SYSTEM PRESSURIZED	5 DROPS/MIN	30 DROPS/MIN
		ROD SEALS IN OPERATION	1 DROP/CYCLE (*1)	2 DROPS/CYCLE (*1)

EQUIPMENT	COMPONENT	NORMAL OPERATION LIMIT	DISPATCH LIMITS TO PREVENT DELAYS
4-CONNECTIONS	PIPE-TO-PIPE CONNECTION	NONE	2 DROPS/10 MIN (*2)
	PIPE	NONE	NONE
	SWIVEL FITTING	NONE	30 DROPS/MIN
	MANIFOLD FITTING	NONE	2 DROPS/10 MIN (*2)
	BOBBINS	NONE	2 DROPS/10 MIN (*2)
R	PIPE-TO-FITTING CONNECTION	NONE	2 DROPS/10 MIN (*2)
5-OTHERS	STATIC SEALS	NONE	2 DROPS/10 MIN
	HYDRAULIC MOTOR SHAFT SEALS SLATS, FLAPS, THS, SYSTEM PRESSURIZED	2 DROPS/MIN	8 DROPS/MIN
	SLATS, FLAPS, THS, IN OPERATION	5 DROPS/MIN	30 DROPS/MIN
	DYNAMIC SEAL, SYSTEM PRESSURIZED (DISTRIBUTOR, UNLOCKING JACK)	NONE	1 DROP/MIN
	ALTERNATE BRAKE SYSTEM	(*3)	(*3)
	BRAKE UNIT (AT REST)	NONE	NONE
	BRAKE UNIT (PRESSURE APPLIED)	1 DROP/MIN	2 DROPS/MIN

(*1) 1 cycle = 1 Flight control surface operation from stop to stop.
(*2) Make sure the connection is tightened to the correct torque.
(*3) The total leakage from the components that are part of the alternate brakes must not be more than 10 drops/min.

1/ The total leakage in the Green system must not be more than 100 drops/min.
The total leakage in the Yellow system must not be more than 100 drops/min.
The total leakage in the Blue system must not be more than 100 drops/min.

EQUIPMENT	COMPONENT	NORMAL OPERATION LIMIT	DISPATCH LIMITS TO PREVENT DELAYS
2/ When an aircraft shows an abnormal leakage value, we authorize aircraft dispatch under certain conditions. - equipment leakage is lower than dispatch limit - one system only can present an abnormal equipment leakage - for one system, amount of leakage is lower than maximum leakage authorized for the system - check hydraulic reservoir levels - these checks are repeated before each flight. 3/ Take care that the drops do not fall on an electric area. 4/ There are approximately 20 drops in a cubic centimeter and 75600 drops in 1 US gallon (3.785 dm^3).			

NOTE : - These indications are effective with reservoirs and hydraulic systems pressurized.
- Measurements will be carried out at normal operating temperature (minimum temperature: 20°C (68°F).

(3)Component check procedures

**ON A/C 001-100,

(Ref. Fig. 601)

**ON A/C 101-200,

(Ref. Fig. 602)

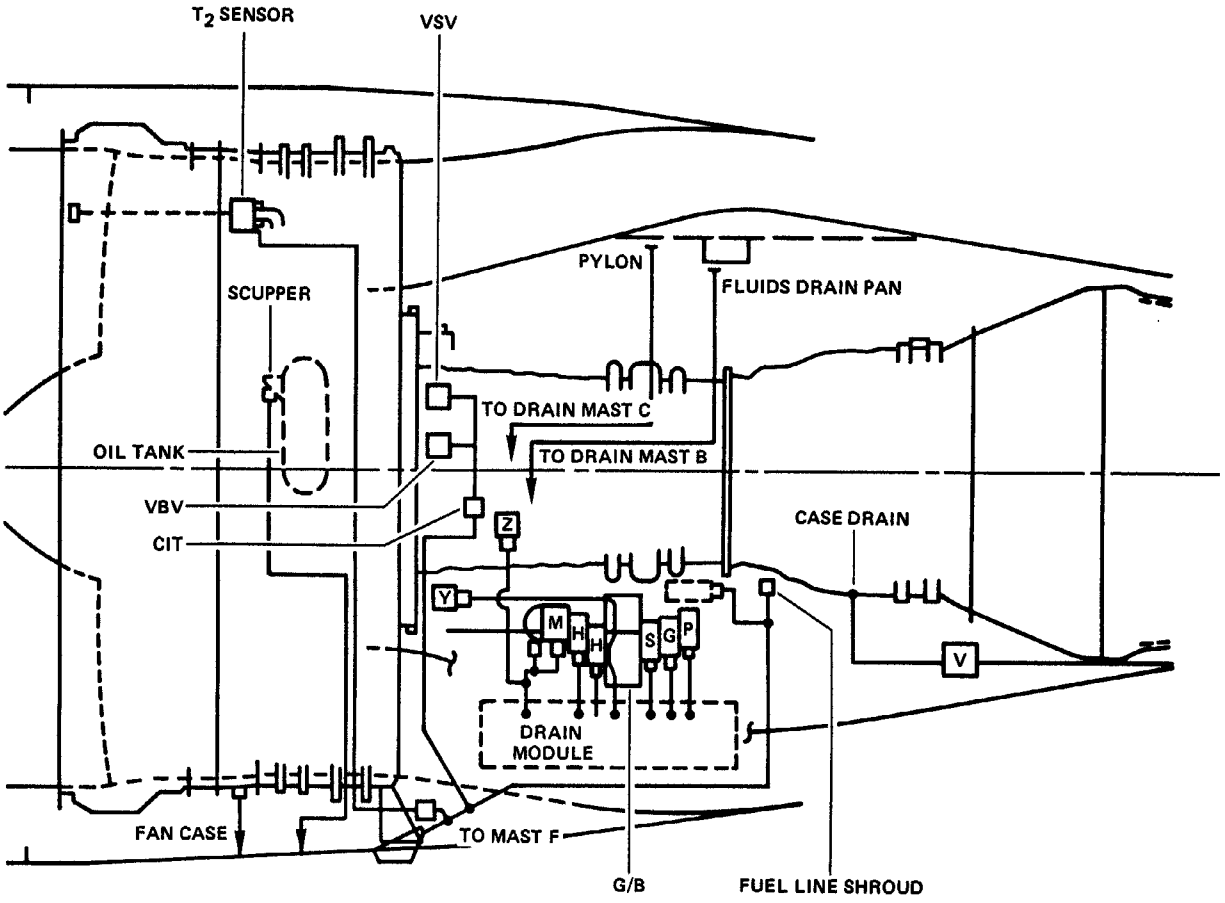
**ON A/C ALL

(a)Functional check of leakage rate of each engine-driven pump shaft-seal drain-outlet

1 On the engine drain module/manifold, open the hydraulic pump shaft seal drain device.
2 Measure the number of drops per minute that are dripping out.
3 Check with the maximum permissible leakage rate table given in Para. 1.C.(2).

(b)Servo controls

1 Pressurize hydraulic system corresponding to servo controls to be checked.
2 Place flight controls in neutral position (they must not be moved from this position throughout the check).
3 Wait three minutes for external leakage to stabilize, then



SHROUD DRAINS

VBV - VARIABLE BYPASS VALVE ACTUATOR
VSV - VARIABLE STATOR VANE ACTUATOR
FUEL NOZZLE SUPPLY
T_2 SENSOR - AIR INLET TEMPERATURE
N_1 SENSOR - FAN SPEED

LEGEND :

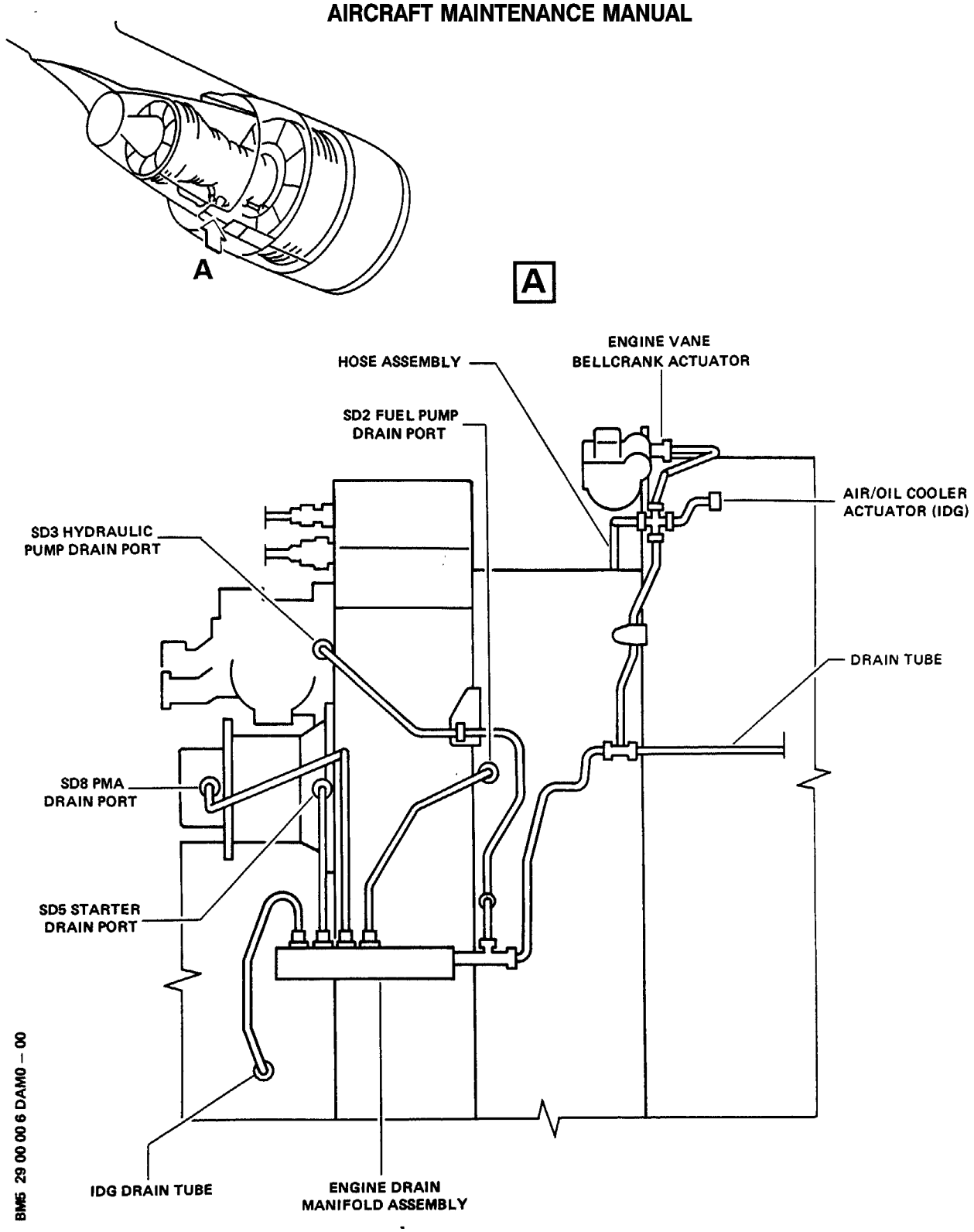
A - AIR POPPET VALVE
B - FUEL DIRECT DRAIN
C - FUEL OIL WATER DIRECT DRAIN
D - FUEL COLLECT DRAIN
E - OIL COLLECT DRAIN
F - FUEL DIRECT DRAIN

SEAL DRAINS
- Y - N_1 SPEED SENSOR
- G - IDG DRAIN
- H - HYDRAULIC PUMP
- M - MAIN ENGINE CONTROL
- P - FUEL PUMP
- S - STARTER

V - VALVE
X - IDG OIL COOLER PRESSURE RELIEF
Z - ACC SIGNAL VALVE
· KIT INTERFACE CONNECTIONS

BM5 29 00 00 6 ABMO – 16

Draining System
Figure 601



Draining System
Figure 602

measure leakage rate (For tolerances, ref. Para 1.C.(2).(b).).

(c)Maximum permissible leakage for hydraulic components in normal operation :
Slight seepage, without formation of drops, is allowed.
In case of seepage, clean the component, tighten the nuts and the bolts, and when appropriate, look for cracks. Monitor components daily.

(d)Maximum permissible leakage for the hydraulic lines and unions in normal operation :
In case of slight seepage, retighten unions to specified torque and wipe carefully.
Pressurize relevant hydraulic system and observe faulty item.
If any seepage occurs, replace union or line. No leakage is permitted on lines and unions.
NOTE : For a whole hydraulic system, the total external leakage of components shall not exceed 100 drops max. per minute. (5 CC max. per minute).

2. Internal Leakage Check of Each Hydraulic System by Means of Auxiliary Power

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BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING ON RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT RELEVANT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED BEFORE ATTEMPTING MAINTENANCE PROCEDURES ON ENGINE. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

A. Reason for the Job
To monitor servo control internal leakage using Green system electric pumps and Green/Blue and Green/Yellow power transfer units.
NOTE : For inservice aircraft, a test performed with Green electric pumps enables to indicate whether the total internal leakage of a

system is higher or lower than the max. permissible value.
. If the leak rate is above the max. permissible value, it is necessary to measure internal leakage per sections of system with leakage measuring equipment, using isolation valves F, G and H on the system concerned (servo controls pushbutton switch must be released (out)).
. If the leak rate is below or equal to the max. permissible value, no action is necessary.

B. Equipment and Materials

ITEM	DESIGNATION
(1)C21888-0-1	Ground Safety Lock
(2)D22333000	Pin - Ground Safety Lock MLG
Referenced Procedures	
- 22-10-00, P. Block 501	Auto Pilot Test in CMD Mode
- 22-26-00, P. Block 501	Yaw Damper
- 22-27-00, P. Block 501	Pitch Trim - Engage/Disengage
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 34-25-00, P. Block 501	Inertial Reference System (IRS)
- 27-33-00, P. Block 501	Artificial Feel

**ON A/C 105-200,

Post SB 32-2068 For A/C 105-200,

B. Equipment and Materials

ITEM	DESIGNATION
(1)C21888-0-2	Ground Safety Lock
(2)D22333000	Pin - Ground Safety Lock MLG
(3)EMH1569S	Cart - Hydraulic Ground Power Supply 150l/mn (39.6 USGPM)
Referenced Procedures	
- 22-10-00, P. Block 501	Auto Pilot Test in CMD Mode
- 22-26-00, P. Block 501	Yaw Damper
- 22-27-00, P. Block 501	Pitch Trim - Engage/Disengage
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-10-00, P. Block 301	Main Hydraulic Power Pressurization/ Depressurization
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 34-25-00, P. Block 501	Inertial Reference System (IRS)
- 27-33-00, p. Block 501	Artificial Feel

**ON A/C ALL

C. Procedure
(1)Job set-up
(a)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL		Line 101
21VU	ECAM		Line 108
21VU	SDAC and FWC2		Line 109
21VU	AFS/AP1 - FD1		Line 102
21VU	AFS/AP2 - FD2		Line 102
21VU	FAC1		Line 103
21VU	FAC2		Line 103
21VU	AFS/FAC1/26VAC	305CC1	103/G7
21VU	AFS/FAC2/26VAC	305CC2	103/G8
21VU	AFS/FAC1/28VDC	306CC1	103/G3
21VU	AFS/FAC2/28VDC	306CC2	103/G12
21VU	AFS/FAC1/115VAC	309CC1	103/G5
21VU	AFS/FAC2/115VAC	309CC2	103/G10
21VU	ADS/ADC2/26VAC	8FL2	105/E9
21VU	ADS/ADC2/115VAC	9FL2	105/E10
22VU	MIN EQPT BAY SUPPLY/ADS/ADC1/115VC	9FL1	208/B19
22VU	ADS/CAPT/ALTM/& VSI	24FL1	204/F18
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
22VU	LDG/GEAR/EXTEND/CTL	1GA	201/J28
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	KRUGER	45CV	333/T61
133VU	SLATS/26VAC/SYS 1	3CV	335/R65
133VU	SLATS/26VAC/SYS 2	4CV	335/R64
133VU	SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS 2	9CV	335/R66
133VU	SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	L/G PROX DET/& RELAYS SYS1/RELAYS &/ RETRACT/CTL	2GB	332/U51
133VU	L/G PROX DET/& RELAYS SYS1/FLT/GND	119GB	332/U52
133VU	L/G PROX DET/& RELAYS SYS1/GEAR DN &/ CTR PNL/POS IND	3GB	332/U53
133VU	L/G PROX DET/& RELAYS SYS2/GEAR DOWN &/OVHD PNL/POS IND	83GB	331/V51
133VU	L/G PROX DET/& RELAYS SYS 2/FLT/GND	1GB	331/V52
133VU	BRAKES SYSTEM/CTL UNIT/CTL &/WARN	5GG	333/T56
133VU	BRAKES SYSTEM/CTL UNIT/LAND/ RECOVERY/ SUPPLY	98GG	333/T55
133VU	BRAKES SYSTEM/CTL UNIT/NORM	2GG	332/U55
133VU	BRAKES SYSTEM/CTL UNIT/SUPPLY	41GG	332/U56

PANEL	SERVICE	IDENT.	LOCATION
133VU	BRAKES SYSTEM/CTL UNIT/NORM	4GG	331/V55
133VU	BRAKES SYSTEM/CTL UNIT/SUPPLY	42GG	331/V56
133VU	AUTO BRK	95GG	335/R57
133VU	RSVR/WARN	1GR	333/T58
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	RSVR/QTY/IND	1GQ	333/T59
132VU	MAINT PANEL/ANN & MFA	1WB	324/L78

(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.
CAUTION : DURING TEST, MAKE CERTAIN THAT NO OTHER TEST IS PERFORMED :
- ON FLIGHT CONTROLS
- ON ARTIFICIAL FEEL SYSTEM.
DISPLAY WARNING NOTICES.

(2)Place aircraft in the following configuration :

(a)Make certain that landing gear is downlocked
Safety pins installed and on Center Instrument Panel 4VU, landing gear control lever in NEUTRAL position.
Engines are shut down, ENG1 and ENG2, HP fuel shut off valves control lever in OFF position.

(b)On panel 427VU :
- PTU pushbutton switches released (out), ON legends off.
- ELEC PUMPS pushbutton switch released (out), ON and LO PR legends off.
- Green, Yellow and Blue hydraulic reservoir quantity indicator pointers in GREEN segment.
- OVHT and AIR warning lights off.

(c)Start up both Green system electric pumps (Ref. 29-21-00, P. Block 301) :
On panel 427VU, press ELEC PUMPS pushbutton switch, ON legend comes on.

(d)On ECAM control panel, press HYD pushbutton switch :
HYD page appears, ON R ECAM display unit, check GREEN system pressure rise.

(e)On panel 427VU, press PTU G/B pushbutton switch, ON legend comes on.
On R ECAM display unit, check BLUE system pressure rise.

(f)On panel 427VU, press PTU G/Y pushbutton switch, ON legend comes on.
On R ECAM display unit, check YELLOW system pressure rise.

(g)Make certain that on panel 428VU, servo-controls pushbutton switches are as follows :
Blue, yellow, and Green pressed (in) (OFF, LO PR legends are OFF).

(h)Ground spoilers function not preselected, speed brake control lever in RET position.

(j)Operate flight controls and on center pedestal 9VU, move flap and

slat control lever to operate slats and flaps several times until hydraulic fluid temperature reaches normal operating value, let flap and slat control lever to position 1 (0/0).

NOTE : Align IRS 1/2/3 to prepare engagement of YAW DAMPER (Ref. 34-25-00, P. Block 501).

(k)On PITCH FEEL section of panel 428VU, make certain that both SYS 1 and SYS 2 pushbutton switches are pressed (in).

NOTE : This note is to point out some details about YAW DAMPER 1(2) and AUTO PILOT 1(2) engagement.

- YAW DAMPER 1(2) (Ref. 22-26-00, P. Block 501 para. 1.A. up to and including (3)(b) action (1)) :
  . The engagement procedure calls for, in job set-up paragraph, pressurization of Blue and Yellow hydraulic systems. Please do not take into account this condition which is no longer necessary for electric engagement of YAW DAMPER 1(2).
  . The relevant procedure is specific to engagement of YAW DAMPER 2 however, it is also valid for YAW DAMPER 1 engagement provided that for action (1) it is the YAW DAMPER 1 lever which is placed in ON position.
- AUTO PILOT 1(2) (Ref. 22-10-00, P. Block 501 A.P Test in CMD Mode para. 1.C.) :
  . The engagement procedure calls for, in job set-up paragraph, pressurization of Green and Yellow hydraulic systems. Please do not take into account this condition and only pressurize the hydraulic system relevant to AUTO PILOT to engage i.e Green system for AUTO PILOT 1 and Yellow system for AUTO PILOT 2.

(3)Check of Green system

(a)On hydraulic panel 427VU, place power transfer unit controls in the following configuration :
- PTU G/B pushbutton switch released (out), ON legend OFF.
- PTU G/Y pushbutton switch released (out), ON legend OFF.

(b)On SERVO CTL section of panel 428VU, select pushbutton switches as follows :
- Blue and Yellow released (out).
- Green pressed (in).

(c)Engage YAW DAMPER 2 (Ref. 22-26-00, P. Block 501, Para. 1.A. up to and including (3)(b), action (1)).

(d)Engage PITCH TRIM 1 and 2 (Ref. 22-27-00, P. Block 501, Para. 1.A. up to and including (3).(b), action (1)).

(e)Engage AUTO PILOT 1 (Ref. 22-10-00, P. Block 501, A.P. test in C.M.D. mode Para. 1.C.).

NOTE : Perform engagement procedure up to and including the following actions of 1.C.(3).(b).1. :
- place AP1 lever in ON position
- press CWS/CMD pushbutton switch (CMD legend comes on).

(f)To avoid PITCH TRIM control wheel movement during leakage measurement with AUTO PILOT 1 engaged, perform the following actions :
- on glareshield panel, on FCU, pull V/S knob and select a negative vertical speed VZ = -500 ft./mn.

The PITCH TRIM control wheel will move to nose down direction and will

stop (leave the AFS in this condition during the entire internal leakage measurement).

(g)Open, safety and tag circuit breakers 8CV and 4CV.

(h)On center pedestal 9VU, move flap and slat control lever from position 1 (0/0) to position 2 (15/0) to extend Krueger flaps.

(j)On panel 471VU, place and hold ELEC PUMPS TEST switch in PUMP1 or PUMP2 position (switch is spring-loaded in neutral position).

(k)On center pedestal 9VU, move back flap and slat control lever from position 2 (15/0) to position 1 (0/0).
After 5 seconds (full retraction of Krueger flaps) and maximum 9 seconds (disengagement of Yaw AUTO PILOT), move flap and slat control lever from position 1 (0/0) to position 2 (15/0).

(l)During operation :
- If Green system pressure (read on ECAM display unit) is higher than 2200 psi, permanent consumption in Green hydraulic system is lower than the maximum value of 17.5 l/mn (1067.5 in^3/mn)
- If Green system pressure (read on ECAM display unit) is lower than 2200 psi, permanent consumption in Green hydraulic system exceeds 17.5 l/mn (1067.5 in^3/mn).
  In this case it is necessary to locate components with excessive internal leakage with leakage measuring equipment using isolation valves F, G and H. (Ref. Para. 3. check and measurement of hydraulic component internal leakage).

(m)Release ELEC PUMPS TEST switch.

(n)Disengage AUTO PILOT 1 (Ref. 22-10-00, P. Block 501).

(p)Disengage PITCH TRIM 1 and 2 (Ref. 22-27-00, P. Block 501).

(q)Disengage YAW DAMPER 2 (Ref. 22-26-00, P. Block 501).

(4)Check of Blue system

(a)Make certain that both Green system electric pumps are ON.

(b)On hydraulic panel 427VU, place power transfer unit controls in the following configuration :
- PTU G/B pushbutton switch pressed (in), ON legend on.
- PTU G/Y pushbutton switch released (out), ON legend off.

(c)On SERVO CTL section of panel 428VU, select pushbutton switches as follows :
- Green and Yellow released (out).
- Blue pressed (in).

(d)Engage YAW DAMPER 1 (Ref. 22-26-00, P. Block 501, Para. 1.A. up to and including (3)(b). action (1)).

(e)Operate elevator servo controls at maximum speed (Ref. 27-31-00, P. Block 501, Para. 3.D., functional test of Elevator Controls).
NOTE : - For job set-up it is not necessary to have conditions (1)(c), (1)(d) and (1)(f) satisfied.
- For Para. 3.D.(1). functional test, operation of control column (Elevator deflection) must be performed at maximum speed.

During elevator servo control operation :
- if Green system pressure (read on ECAM display unit) is higher than 2250 psi, permanent consumption in Blue hydraulic system is lower than 17.6 l/mn (1073.6 in^3/ mn) maximum.
- if Green system pressure (read on ECAM display unit) is lower than

2250 psi, permanent consumption in Blue hydraulic system is higher than 17.6 l/mn (1073.6 in³/mn). In this case it is necessary to locate components with excessive internal leakage with leakage measuring equipment, using isolation valves F, G and H. (Ref. Para. 3. Check and measurement of hydraulic component internal leakage).

(f)Disengage YAW DAMPER 1 (Ref. 22-26-00, P. Block 501).

(5)Check of Yellow system

(a)Make certain that both Green system electric pumps are ON.

(b)On hydraulic panel 427VU, place power transfer unit controls in the following configuration :
- PTU G/B pushbutton switch released (out), ON legend off
- PTU G/Y pushbutton switch pressed (in), ON legend on.

(c)On SERVO CTL section of panel 428VU, select pushbutton switches as follows :
- Green and Blue released (out).
- Yellow pressed (in).

(d)Check that flap and slat control lever is on position 2 (15/0).

(e)Engage YAW DAMPER 2 (Ref. 22-26-00, P. Block 501, Para. 1.A. up to and including (3)(b), action (1)).

(f)Engage PITCH TRIM 1 (Ref. 22-27-00, P. Block 501).

(g)Engage AUTOPILOT 2 :
(Ref. 22-10-00, P. Block 501 - A.P Test in C.M.D Mode para.1.C.).
NOTE : Perform engagement procedure up to and including the following action of 1.C.(3).(b).1. :
- place AP2 lever in ON position
- press CWS/CMD pushbutton switch (CMD legend comes on).

(h)To avoid PITCH TRIM control wheel movement during leakage measurement with AUTO PILOT 2 engaged, perform the following actions :
- on glareshield panel, on FCU, pull V/S knob and select a negative vertical speed VZ = -500 ft./mn.

The PITCH TRIM control wheel will move to nose down direction and will stop (leave the AFS in this condition during the entire internal leakage measurement).

(j)On panel 471VU, place and hold ELEC PUMPS TEST switch in PUMP1 or PUMP2 position.
(Switch is spring loaded in neutral position).

(k)Record Green pressure :
- if Green system pressure (read on ECAM display unit) is higher than 2250 psi, permanent consumption in Yellow hydraulic system is lower than the maximum value of 18.5 l/mn (1128.5 in³/mn).
- If Green system pressure (read on ECAM display unit) is lower than 2250 psi, permanent consumption in Yellow hydraulic system is higher than the maximum value of 18.5 l/mn (1128.5 in³/mn). In this case it is necessary to locate components with excessive internal leakage with leakage measuring equipment, using isolation valves F, G and H. (Ref. Para 3. Check and measurement of hydraulic component internal leakage).

(l)Release ELEC PUMPS TEST switch

(m)Disengage AUTO PILOT 2 (Ref. 22-10-00, P. Block 501)

(n)Disengage PITCH TRIM 1 (Ref. 22-27-00, P. Block 501).

(p)Disengage YAW DAMPER 2 (Ref. 22-26-00, P. Block 501).
(q)On hydraulic panel 427VU release PTU G/Y pushbutton switch (ON legend OFF).

(6)Close-up
(a)In flight compartment
On SERVO CTL section of panel 428VU, place SERVO-CONTROLS pushbutton switches in the following configuration : Green, Blue and Yellow pressed (in).
(b)Remove tags and close circuit breakers 8CV and 4CV.
(c)On center pedestal 9VU, move flap and slat control lever from second to first notch (Krueger flaps and slats retract).
(d)In flight compartment, on hydraulic panel 427VU, release ELEC PUMPS pushbutton switch (ON and LO PR legends OFF).
(e)De-energize the aircraft electrical network

3. Measurement, Record and Monitoring of Each Hydraulic System Internal Leakage Rate

A. General

Leakage is measured per group of user services, one remaining supplied with fluid while the others are isolated by groups of three isolation valves installed on each hydraulic system (Green, Blue and Yellow).
The choice of measuring equipment (PDQ meter or equivalent) is left to the airlines. It is not an on-board instrument and serves to take a conventional type measurement of the flow rate on the hydraulic ground power cart used.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES AND LANDING GEAR ARE CLEAR.

CHECK THAT ANY PERSONNEL NOT REQUIRED BY THE TEST IS CLEAR OF THE AIRCRAFT, AND THAT NO OTHER WORK IS IN PROGRESS.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	FLOWMETER 20 L.MN (5.2833 US GAL.MN), calibrated to +/- 1.5% over full range
(2)EMH1569S	Cart-Hydraulic Ground Power Supply 150 l/mn (39.6 USGPM)
(3)	Access Platform, 2.60 m (8 ft. 8 in.)
(4)97A29102035000	Connector - Pressurizing, Hydraulic Tank
(5)C21888-0-1	Ground Safety Lock
(6)D22333000	Pin - Ground Safety Lock MLG
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 29-10-00, P. Block 301	Main Hydraulic Power Pressurization/ Depressurization
- 22-10-00, P. Block 501	Autopilot
- 27-33-00, P. Block 501	Artificial Feel
- 22-26-00, P. Block 501	Yaw Damper
- 22-27-00, P. Block 501	Pitch Trim - Engage/Disengage
- 34-25-00, P. Block 501	Inertial Reference System (IRS)

C. Procedure

(1)Job set-up
(a)Energize the aircraft electrical network (ref. 24-41-00, P. block 301).
Make certain that electronics racks ventilation is correct.
(b)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION

R **ON A/C 105-200,

R Post SB 32-2068 For A/C 105-200,

R (3) Access Platform, 2.60 m (8 ft. 8 in.)
R (4)97A29102035000 Connector - Pressurizing, Hydraulic Tank
R (5)C21888-0-2 Ground Safety Lock
R (6)D22333000 Pin - Ground Safety Lock MLG
R Referenced Procedures
R - 12-12-29, P. Block 1 Hydraulic
R - 24-41-00, P. Block 301 AC External Power Control
R - 29-14-00, P. Block 301 Hydraulic Reservoir Pressurizing System
R - 32-12-11, P. Block 301 Main Gear Main Door (Ground Door(s) Opening)
R - 29-10-00, P. Block 301 Main Hydraulic Power Pressurization/
R Depressurization
R - 22-10-00, P. Block 501 Autopilot
R - 27-33-00, P. Block 501 Artificial Feel
R - 22-26-00, P. Block 501 Yaw Damper
R - 22-27-00, P. Block 501 Pitch Trim - Engage/Disengage
R - 34-25-00, P. Block 501 Inertial Reference System (IRS)

R C. Procedure
R (1)Job set-up
R (a)Energize the aircraft electrical network (ref. 24-41-00, P. block 301).
R Make certain that electronics racks ventilation is correct.
R (b)Make certain that the following circuit breakers are closed :

R PANEL	SERVICE	IDENT.	LOCATION

R **ON A/C ALL

21VU	ARTF FEEL		Line 101
21VU	ECAM		Line 108
21VU	SDAC and FWC2		Line 109
21VU	AFS/AP1-FD1		Line 102
21VU	AFS/AP2-FD2		Line 102
21VU	FAC1		Line 103
21VU	FAC2		Line 103
21VU	AFS/FAC1/26VAC	305CC1	103/G7
21VU	AFS/FAC2/26VAC	305CC2	103/G8
21VU	AFS/FAC1/28VDC	306CC1	103/G3
21VU	AFS/FAC2/28VDC	306CC2	103/G12

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/FAC1/115VAC	309CC1	103/G5
21VU	AFS/FAC2/115VAC	309CC2	103/G10
21VU	ADS/ADC2/26VAC	8FL2	105/E 9
21VU	ADS/ADC2/115VAC	9FL2	105/E10
22VU	MIN EQPT BAY SUPPLY/ADS/ADC1/115VC	9FL1	208/B19
22VU	ADS/CAPT/ALTM/& VSI	24FL1	204/F18
101VU	HYD/PUMP	1GE	GEN1/B8
22VU	LDG/GEAR/EXTEND/CTL	1GA	201/J28
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	KRUGER	45CV	333/T61
133VU	SLATS/26VAC/SYS 1	3CV	335/R65
133VU	SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS 2	9CV	335/R66
133VU	SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	SLATS/26VAC/SYS 2	4CV	335/R64
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	L/G PROX DET/& RELAYS SYS 1/RELAYS &/ RETRACT/CTL	2GB	332/U51
133VU	L/G PROX DET/& RELAYS SYS 1/FLT/GND	119GB	332/U52
133VU	L/G PROX DET/& RELAYS SYS 1/GEAR DN &/ CTR PNL/POS IND	3GB	332/U53
133VU	L/G PROX DET/& RELAYS SYS 2/GEAR DOWN &/OVHD PNL/POS IND	83GB	331/V51
133VU	L/G PROX DET/& RELAYS SYS 2/FLT/GND	1GB	331/V52
133VU	BRAKES SYSTEM/CTL UNIT/ CTL &/WARN	5GG	333/T56
133VU	BRAKES SYSTEM/CTL UNIT/LAND/RECOVERY/ SUPPLY	98GG	333/T55
133VU	BRAKES SYSTEM/CTL UNIT/NORM	2GG	332/U55
133VU	BRAKES SYSTEM/CTL UNIT/SUPPLY	41GG	332/U56
133VU	BRAKES SYSTEM/CTL UNIT/NORM	4GG	331/V55
133VU	BRAKES SYSTEM/CTL UNIT/SUPPLY	42GG	331/V56
133VU	AUTO BRK	95GG	335/R57
133VU	RSVR/WARN	1GR	333/T58
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	RSVR/QTY/IND	1GQ	333/T59
132VU	MAINT PANEL/ANN & MFA	1WB	324/L78

(c)Make certain that aircraft is in the following configuration :
- Aircraft on wheels and safety pins installed.
- Landing gear normal control lever in NEUTRAL position.

(d)Open left main landing gear door (Ref. 32-12-11, P. Block 301).
WARNING : WHEN DOOR IS OPEN MAKE CERTAIN THAT SAFETY COLLAR IS POSITIONED ON DOOR ACTUATING CYLINDER.

(e)Make certain that hydraulic reservoirs are pressurized to 3.5 bars (50 psi) ; pressurize if required (Ref. 29-14-00, P. Block 301).
(f)Check that fluid in the three hydraulic reservoirs is at correct fill level. Top up if required (Ref. 12-12-29, P. Block 1).
(g)Connect hydraulic ground power cart, equipped with measuring equipment (flowmeter), to system to be tested. Temperature of fluid during measurement procedures must be higher than 20°C (68°F). Pressurize system until pressure and temperature stabilize (check on ground power cart instruments).

D. Leakage Measurement Procedure

NOTE : A flow rate of 50 l/mn (13.2 USGPM) is sufficient to perform the test.

(1)Pressurize system to be tested to 3000 psi (206 bars). (Ref. 29-10-00, P. Block 301).
(2)Measure the maximum permissible leakage rate (M.P.L.R.) for Q1, Q2, Q3, Q4 and Q5 with respect to the following :

NOTE : System and component maximum permissible leakage rates are established as the limit beyond which system or component performance is degraded to an unacceptable level.
Nominal flow rates Q2, Q3, Q4 and Q5 are indicative of a subsection condition.

(a)Perform all measurements from flow rates Q1 to Q5 to properly determine subsection leakage.

NOTE : Validity of results can be cross-checked using the following equation provided that Q1 is measured with YAW DAMPER and/or PITCH FEEL engaged :
Q1 (left or right) ± 10 % = Q3 + Q4 + Q5 - 2Q2.

1 If Q1 flow rate is BELOW OR EQUAL to the Maximum Permissible Leakage Rate, no action is necessary.
2 If Q1 flow rate EXCEEDS the Maximum Permissible Leakage Rate, do the following :

NOTE : As Q1 flow rate is out of the system M.P.L.R., the subsection M.P.L.R. for Q2 to Q5 is the nominal flow rate which value is given for each system in the leakage measurement paragraphs.
. If one or several measured flow rates Q2, Q3, Q4, Q5 is out of the M.P.L.R, replace the faulty component per para. (3).
. If one or several measured flow rates Q2, Q3, Q4, Q5 is out of the M.P.L.R., and that the components of the involved subsection are within their internal leakage limit, remove and replace one or more components to restore subsection and system leakage rate to permissible limits.

(b)To avoid PITCH TRIM control wheel movement during measurement leakage with AUTO PILOT 1(2) engaged after engagement of AUTO PILOT 1(2) perform the following actions :
- On glareshield panel, on FCU, pull V/S knob and select a negative vertical speed VZ = -500 ft./mn.

NOTE : This note is to point out some details about YAW DAMPER 1(2) and AUTO PILOT 1(2) engagement :
- YAW DAMPER 1(2) (Ref. 22-26-00, P. Block 501 para. 1.A. up to

and including (3)(b). action (1)) :

. The engagement procedure calls for, in job set-up paragraph, pressurization of Blue and Yellow hydraulic systems. Please do not take into account this condition and only pressurize the hydraulic system relevant to YAW DAMPER to engage i.e Blue system for YAW DAMPER 1 and Yellow system for YAW DAMPER 2.

. The relevant procedure is specific to engagement of YAW DAMPER 2 however, it is also valid for YAW DAMPER 1 engagement provided that for action (1) it is the YAW DAMPER 1 lever which is placed in ON position.

- AUTO PILOT 1(2) (Ref. 22-10-00, P. Block 501 A.P Test in CMD Mode para. 1.C.) :

. The engagement procedure calls for, in job set-up paragraph, pressurization of Green and Yellow hydraulic system. Please do not take into account this condition and only pressurize the hydraulic system relevant to AUTO PILOT to engage i.e Green system for AUTO PILOT 1 and Yellow system for AUTO PILOT 2.

(3)If permanent consumption exceeds permissible limit, isolate the faulty component by :

- isolating section of system
- checking aurally
- checking local temperature variations.

CAUTION : TO AVOID COMPONENT DAMAGE IN CASE SUPPLY PRESSURE IS APPLIED DO NOT BLANK SERVO CONTROL RETURN OPENING.

A method of confirming that a servo control is faulty is to repeat the measurement procedure with the hydraulic lines to the suspect servo control disconnected and capped.

If a normal leakage rate is then recorded, this confirms that the suspect servo control is faulty.

E. Green System Testing
(Ref. Fig. 603)
NOTE : On Green system isolation valves :
Letter F is associated with Tail Unit.
Letter G is associated with Right Wing.
Letter H is associated with Left Wing.

(1)Job set-up
(a)Check that green system pressure is 3000 psi (206 bars), then shut down hydraulic ground power cart.
(b)Check pumps delivery relief valve 1063 to detect possible jamming of valve in open position, either aurally or by feel (vibrations).
(c)Pressurize system again to 3000 psi (206 bars).

(2)Leakage rate check
(a)For each position of isolation valves, perform actions shown on following chart and compare leakage rate recorded with corresponding permissible leakage rate.
NOTE : In each configuration, wait for pressure and leakage to stabilize before taking measurements with flowmeter.
(b)On PITCH FEEL section of panel 428VU, make certain that SYS 1 pusbutton switch is pressed (in).
NOTE : Align IRS 1/2/3 to prepare engagement of YAW DAMPER 1 (Ref. 34-25-00, P. Block 501).

MAXIMUM PERMISSIBLE LEAKAGE RATE - GREEN SYSTEM :
17.5 l/mn (1067 in^3/mn) (Left or Right).
. If the Maximum Permissible Leakage Rate is above 17.5 l/mn, check subsections to find the cause.
. If the Maximum Permissible Leakage Rate is below or equal to 17.5 l/mn, no action is necessary.

(c)Flow rate Q1
1 In flight compartment : on panel 428VU, make certain that Green servo controls pushbutton switch is pressed (in).
2 In hydraulics compartment, place Green system isolation valves in the following configuration : F, G, H closed.
NOTE : Measurements must be taken with aileron control wheel turned full left or full right.

COMPONENTS	MAX PERMISSIBLE LIMIT
2 All speed aileron (ASA) servo controls	4 l/mn (244 in^3/mn)
2 Elevator servo controls	5 l/mn (305 in^3/mn)
1 Rudder servo control	2.5 l/mn (153 in^3/mn)
2 Spoiler servo controls	2 l/mn (122 in^3/mn)
1 Trimmable horizontal stabilizer (THS) actuator motor	1.5 l/mn (92 in^3/mn)
1 Slat power control unit motor	0.22 l/mn (13.4 in^3/mn)
1 Flap power control unit motor	0.22 l/mn (13.4 in^3/mn)
Miscellaneous (Yaw AP, Roll AP, Pitch AP, Pitch Feel).	4 l/mn (244 in^3/mn)
2 Power transfer unit (PTU)	0.3 l/mn (18.3 in^3/mn)
1 Landing gear selector valve	0.08 l/mn (4.9 in^3/mn)
1 Brake selector valve	0.17 l/mn (10.4 in^3/mn)

COMPONENTS	MAX PERMISSIBLE LIMIT
1 Landing gear free fall cutout valve	0.07 l/mn (4.3 in³/mn)

3 Leakage Measurement with PITCH TRIM 1 and 2, AUTO PILOT 1 and PITCH FEEL SYS 1 Engaged

NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

R (Ref. Fig. 604)

- On overhead panel on PITCH FEEL section of panel 428VU, make certain that PITCH FEEL SYS 1 (Ref. 27-33-00, P. Block 501) is still engaged.
- Engage PITCH TRIM 1 and 2 (Ref. 22-27-00, P. Block 501, Para. 1.A. up to and including (3)(b), action (1)).
- Engage Yaw DAMPER 1 (2) (Ref. 22-26-00, P. Block 501, Para. 1.A. up to and including (3)(b), action (1)).
- Engage AUTO PILOT 1 (2) (Ref. 22-10-00, P. Block 501, A.P. test in C.M.D. Mode Para. 1.C.)

NOTE : Perform engagement procedure up to and including the following action of 1.C.(3).(b).1. :
- Place AP1 lever in On position
- Press CWS/CMD pushbutton switch (CMD legend comes on).

- Measure leakage

NOTE : The MPLR of the Green system is 17.5 l/mn (1067 in³/mn).

- On glareshield on FCU, disengage AUTO PILOT 1 (2) (Ref. 22-10-00, P. Block 501).
- Disengage PITCH TRIM 1 and 2 (Ref. 22-27-00, P. Block 501).
- Disengage YAW DAMPER 1 (2) (Ref. 22-26-00, P. Block 501).

4 Leakage measurement with PITCH FEEL SYS 1 engaged and AUTO PILOT 1 (2) disengaged.

NOTE : The purpose of this leakage measurement (AUTO PILOT 1 disengaged) is only to allow AUTO PILOT LEAKAGE RATE determination by comparison between the flow rate value recorded in Para. 3. and the one measured in this paragraph.

- On overhead panel on PITCH FEEL section of panel 428VU, make certain that PITCH FEEL SYS 1 (Ref. 27-33-00, P. Block 501) is still engaged.
- open, safety and tag following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/AP1-FD1/FCC1/28VDC	306CA1	102/H3

- measure leakage.

NOTE : If the difference between the flow rate value recorded in Para. 3. and the one measured in this Para. exceeds 3 l/mn (183 in³/mn), it is necessary to check AUTO PILOT for excessive internal leakage.

- Restore system to normal operating condition.

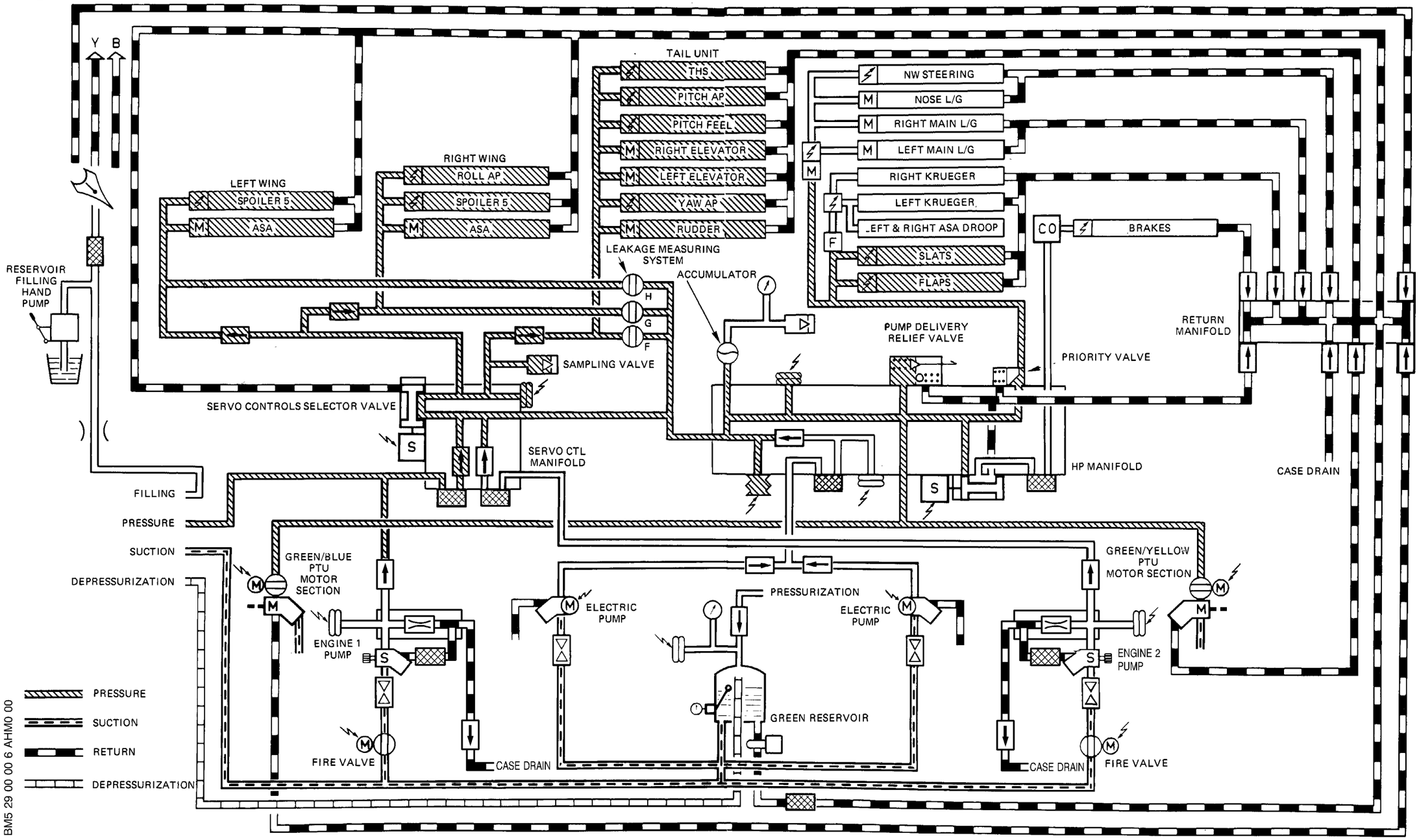
FLOW RATE CHART

POSITION OF ISOLATION VALVES	ACTION	FLOW RATE MEASURED	SUBSECTIONS CONCERNED BY FLOW RATE MEASURED	SUBSECTION FLOW RATE DEDUCTED FROM FLOW RATE MEASURED
F CLOSED G CLOSED H CLOSED	1. - SERVO CONTROLS SELECTOR VALVE SELECTED OPEN - AILERON CONTROL WHEEL TURNED FULL LEFT OR FULL RIGHT	Q1 LEFT Q1 RIGHT	TOTAL Q EITHER Q1 LEFT OR Q1 RIGHT	
F CLOSED G CLOSED H CLOSED	2. - SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE	Q2	Q DOWNSTREAM OF HP MANIFOLD	Q AT FLIGHT CONTROLS = Q2
F OPEN G CLOSED H CLOSED	3. SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE	Q3	Q2 + Q AT TAIL UNIT	Q AT TAIL UNIT = Q3–Q2
F CLOSED G CLOSED H OPEN	4. - SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE - AILERON CONTROL WHEEL TURNED FULL LEFT	Q4	Q2 + Q AT L WING	Q AT L WING = Q4–Q2
F CLOSED G OPEN H CLOSED	5. - SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE - AILERON CONTROL WHEEL TURNED FULL RIGHT	Q5	Q2 + Q AT R WING	Q AT R WING = Q5–Q2

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Flow Rate Chart
Figure 603

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Leakage Measurement Diagram (Flow Rate Q1 - Green System)
Figure 604

R

(d)Flow rate Q2

R (Ref. Fig. 605)

NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

1 In flight compartment : on panel 428VU, release Green servo controls pushbutton switch.

2 In hydraulics compartment, make certain that Green system isolation valves are in the following configuration : F, G, H closed.

NOTE : Measured flow rate is the leakage rate of components located downstream of HP manifold.

COMPONENTS	MAX PERMISSIBLE LIMIT
1 Flap power control unit	0.22 l/mn (13.4 in^3/mn)
1 Slat power control unit	0.22 l/mn (13.4 in^3/mn)
2 Power transfer unit (P.T.U)	0.3 l/mn (18.3 in^3/mn)
1 Landing gear selector valve	0.08 l/mn (4.9 in^3/mn)
1 Brake selector valve	0.17 l/mn (10.4 in^3/mn)
1 Landing gear free fall cutout valve	0.07 l/mn (4.3 in^3/mn)

3 Measure leakage

NOTE : - If Q1 value is below or equal to the M.P.L.R. of system i.e 17.5 l/mn (1067.5 in^3/mn), the M.P.L.R. of subsection is 2 l/mn (121 in^3/mn).

- If Q1 value exceeds the M.P.L.R., of system i.e 17.5 l/mn (1067.5 in^3/mn), the M.P.L.R. of subsection Q2 is 0.6 l/mn (36.6 in^3/mn).
- In both cases, if flow rate Q2 exceeds the relevant M.P.L.R., identify the faulty component using method described in para. 3.D.(3).

If the listed components are within their max. Permissible limit, check the other hydraulic components not isolated during the leakage measurement of Q2 subsection and for which internal leakage is considered negligible.

4 Restore system to normal operating condition.

(e)Flow rate Q3

R (Ref. Fig. 606)

NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

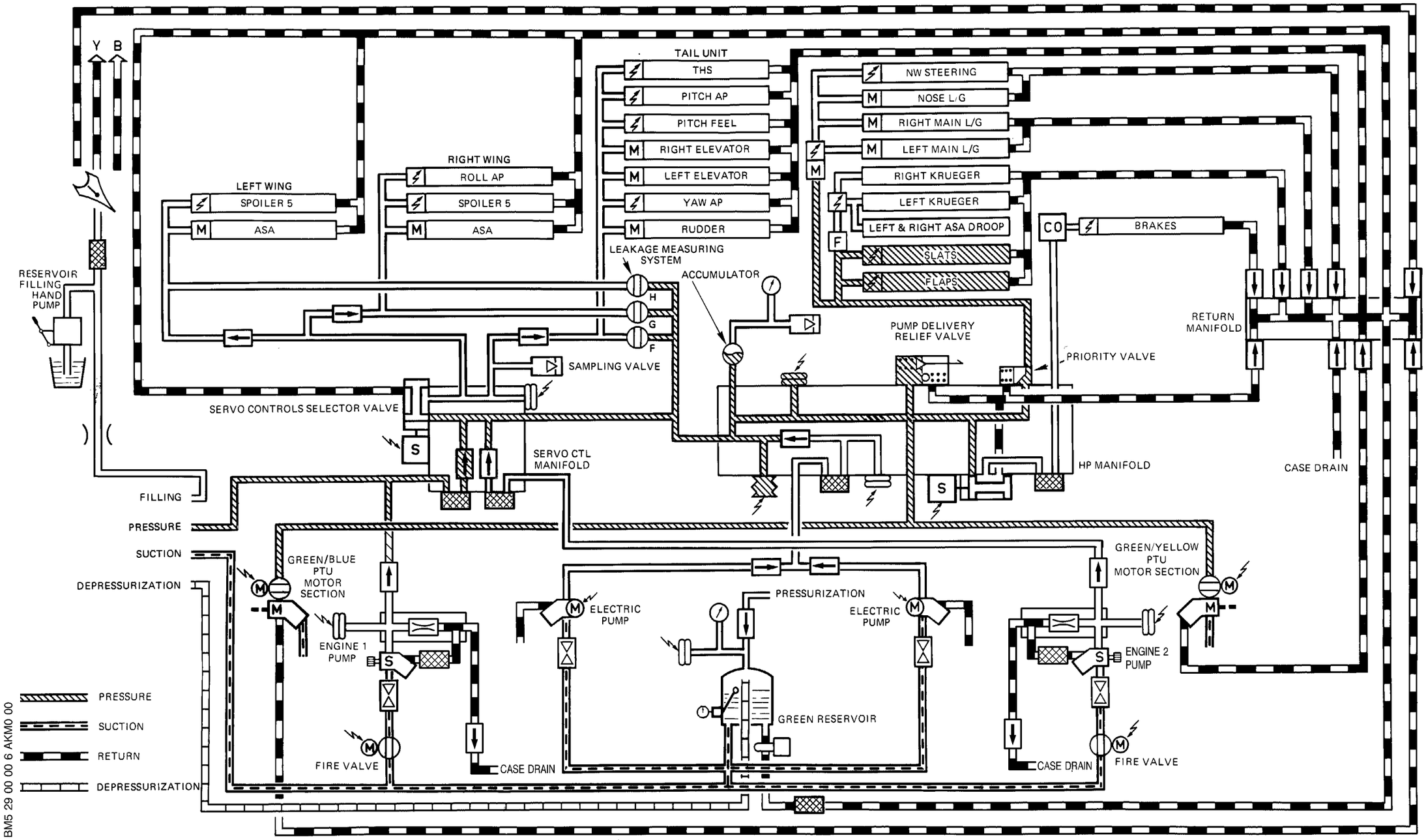
1 In flight compartment : on panel 428VU, make certain that Green servo controls pushbutton switch is released (out).

2 In hydraulics compartment, place Green system isolation valves in the following configuration : F open and G, H closed.

3 On overhead panel, on PITCH FEEL section of panel 428VU, make certain that PITCH FEEL SYS 1 (Ref. 27-33-00, P. Block 501) is still engaged.

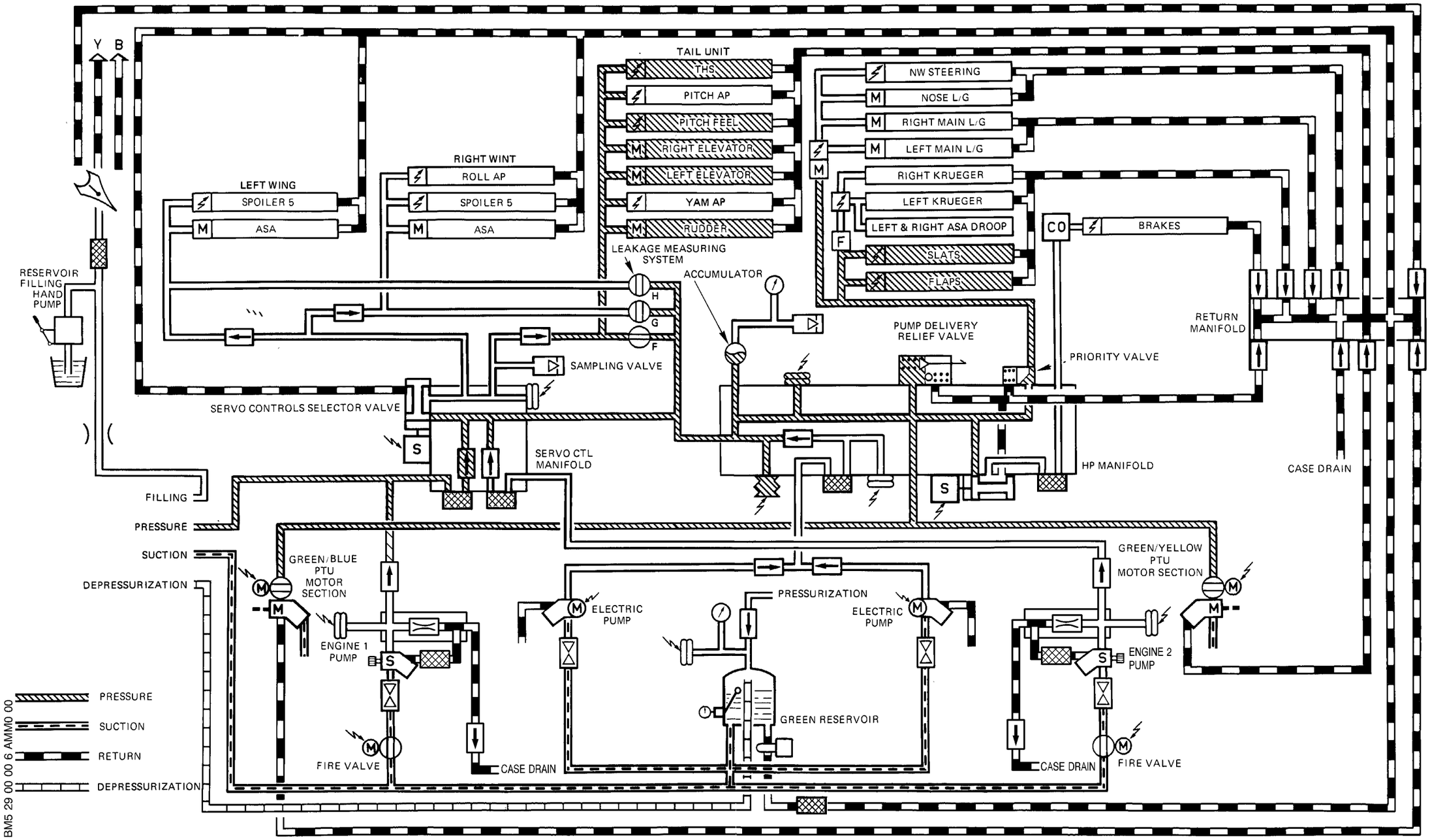
NOTE : Measured flow rate is the leakage rate of equipment located in tail cone and downstream of HP manifold.

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Leakage Measurement Diagram (Flow Rate Q2 - Green System)
Figure 605

R



Leakage Measurement Diagram (Flow Rate Q3 - Green System)
Figure 606

R

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COMPONENTS	MAX PERMISSIBLE LIMIT
2 Elevator servo controls	5 l/mn (305 in³/mn)
1 Rudder servo control	2.5 l/mn (153 in³/mn)
1 THS actuator motor	1.5 l/mn (92 in³/mn)
1 slat power control unit motor	0.22 l/mn (13.4 in³/mn)
1 flap power control unit motor	0.22 l/mn (13.4 in³/mn)
Miscellaneous (Pitch Feel)	1 l/mn (61 in³/mn)
2 Power transfer unit (PTU)	0.3 l/mn (18.3 in³/mn)
1 Landing gear selector valve	0.08 l/mn (4.9 in³/mn)
1 Brake selector valve	0.17 l/mn (10.4 in³/mn)
1 Landing gear free fall cutout valve	0.07 l/mn (4.3 in³/mn)

4 Measure leakage :
NOTE : - If Q1 value is below or equal to the M.P.L.R. of system i.e 17.5 l/mn (1067.5 in³/mn), the M.P.L.R. of subsection Q3 is 10 l/mn (610 in³/mn) + Q2.
- If Q1 valve exceeds the M.P.L.R. of system i.e 17.5 l/mn (1067.5 in³/mn), the M.P.L.R. of subsection Q3 is 7.9 l/mn (482 in³/mn) + Q2.
- In both cases if flow rate Q3 exceeds the relevant M.P.L.R., identify the faulty component using method described in para. 3.D.(3).

5 Restore system to normal operating condition.

(f)Flow rate Q4

R (Ref. Fig. 607)

NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

1 On overhead panel, on panel 428VU make certain that Green servo-controls pushbutton switch is released (out).

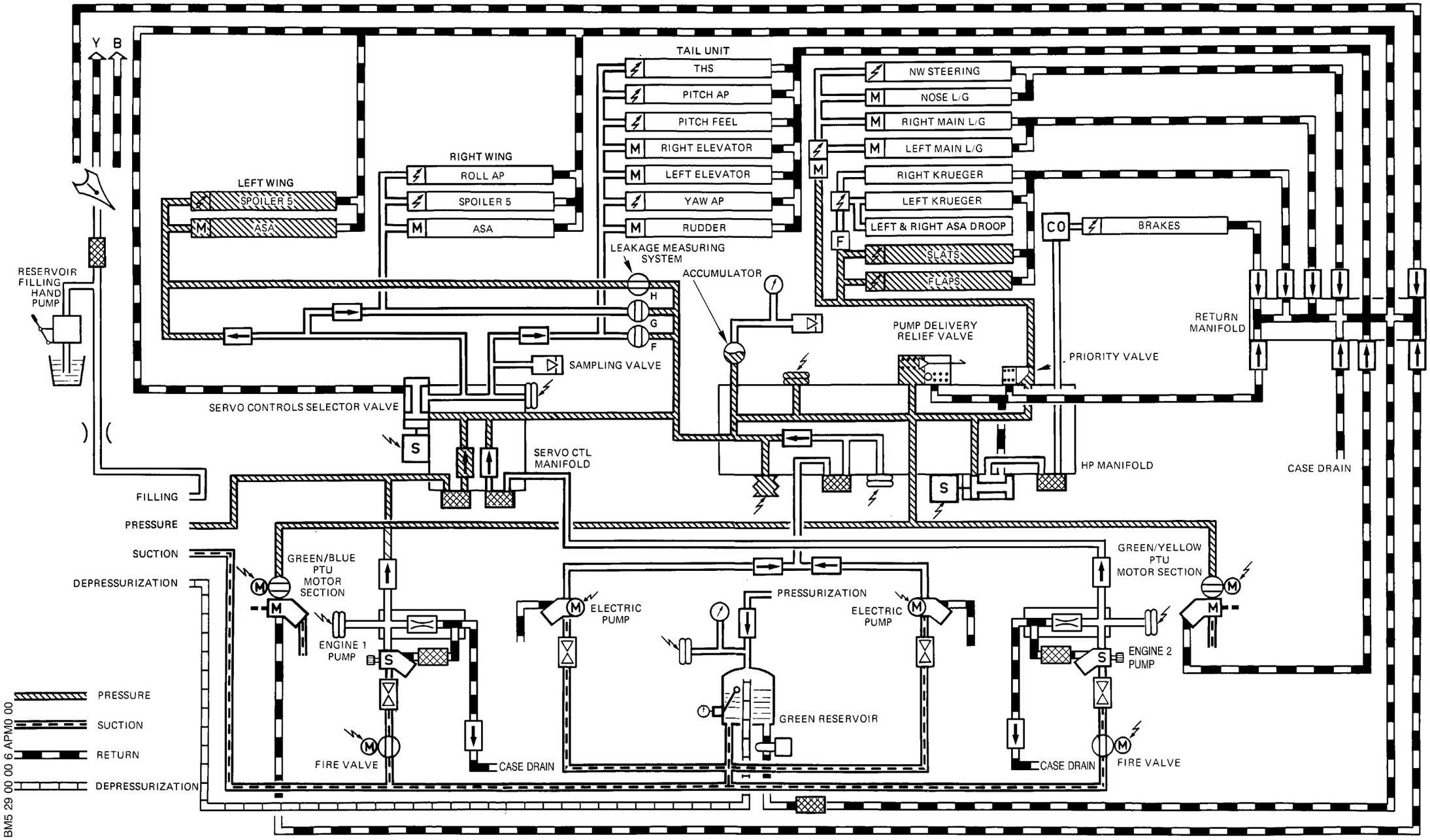
2 In hydraulics compartment, place Green system isolation valves in the following configuration : H open and F, G closed.

3 Make certain that aileron control wheel is in full left position.
NOTE : Measured flow rate is the leakage rate of components located in left wing and downstream of HP manifold.

COMPONENTS	MAX. PERMISSIBLE LIMIT
1 All speed aileron servo control	2 l/mn (122 in³/mn)
1 Spoiler servo control	1 l/mn (61 in³/mn)
1 slat power control unit motor	0.22 l/mn (13.4 in³/mn)
1 Flap power control unit motor	0.22 l/mn (13.4 in³/mn)
2 Power transfer unit (PTU)	0.3 l/mn (18.3 in³/mn)
1 Landing gear selector valve	0.08 l/mn (4.9 in³/mn)
1 Brake selector valve	0.17 l/mn (10.4 in³/mn)
1 Landing gear free fall cutout valve	0.07 l/mn (4.3 in³/mn)

4 Measure leakage
NOTE : The M.P.L.R. of subsection Q4 is 3 l/mn (183 in³/mn)

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Leakage Measurement Diagram (Flow Rate Q4 - Green system)
Figure 607

R

+ Q2. If the M.P.L.R. of subsection Q4 is exceeded, facilitate identification of the faulty component using method described in Para. 3.D.(3).

5 Restore system to normal operating condition.

(g)Flow Rate Q5

R (Ref. Fig. 608)

NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valve position.

1 On overhead panel, on panel 428VU, make certain that Green servo controls pushbutton switch is released (out).

2 In hydraulics compartment, place Green system isolation valves in the following configuration : G open F, H closed.

3 Make certain that aileron control wheel is in full right position.

NOTE : - Measured flow rate is the leakage rate of components located in right wing and downstream of HP manifold.

COMPONENTS	MAX. PERMISSIBLE LIMIT
1 All speed aileron servo control	2 l/mn (122 in^3/mn)
1 spoiler servo control	1 l/mn (61 in^3/mn)
1 slat power control unit motor	0.22 l/mn (13.4 in^3/mn)
1 Flap power control unit motor	0.22 l/mn (13.4 in^3/mn)
2 Power transfer unit (PTU)	0.3 l/mn (18.3 in^3/mn)
1 Landing gear selector valve	0.08 l/mn (4.9 in^3/mn)
1 Brake selector valve	0.17 l/mn (10.4 in^3/mn)
1 Landing gear free fall cutout valve	0.07 l/mn (4.3 in^3/mn)

4 Measure leakage

NOTE : The M.P.L.R. of subsection Q5 must not exceed 3 l/mn (183 in^3/mn) + Q2.
If the M.P.L.R. of subsection Q5 is exceeded, facilitate identification of the faulty component using method described in Para. 3.D.(3).

5 Restore system to normal operating condition.

(3)Green system flow rate measurement close-up :

(a)In hydraulics compartment, close the three Green system isolation valves.

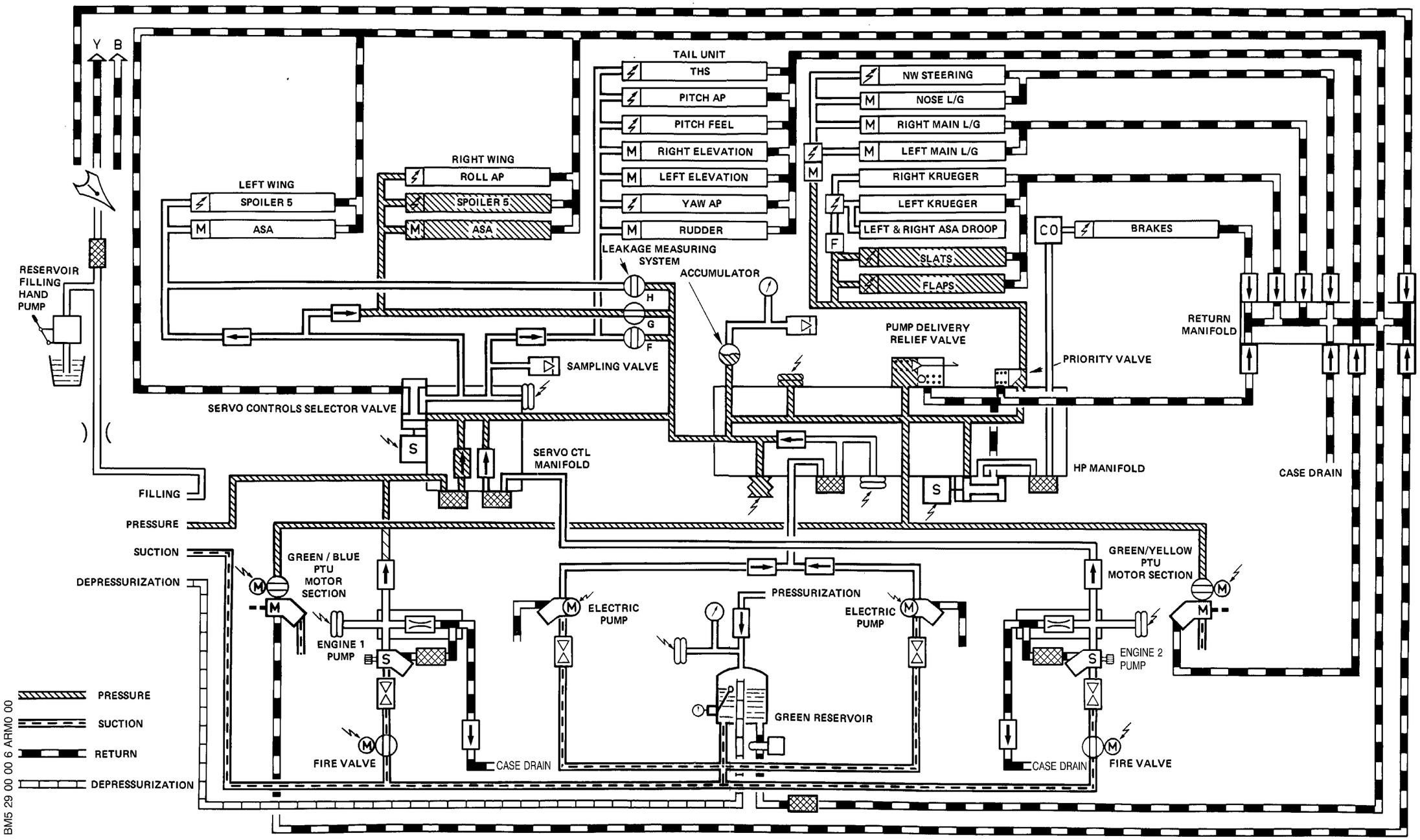
(b)In flight compartment, on panel 428VU, press Green servo controls pushbutton switch.

(c)Remove tag and close circuit breaker : 306CA1.

(d)With Green hydraulic system pressurized, successively operate the following controls :
- elevator
- rudder
- aileron

Extend then retract flaps and slats.
Make certain that components considered deflect and operate normally.

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Leakage Measurement Diagram (Flow Rate Q5 - Green System)
Figure 608

R

F. Blue System Testing

(Ref. Fig. 609)

NOTE : On Blue System Isolation Valves :
- Letter F is associated with Right Wing
- Letter G is associated with Tail Unit
- Letter H is associated with Left Wing

(1)Job set-up

(a)Check that Blue system pressure is 3000 psi (206 bars) then shut down hydraulic ground power cart.

(b)Check pump delivery relief valve 292063 for internal leakage, either aurally or by feel (vibrations).

(c)Pressurize system again to 3000 psi (206 bars). (Ref. 29-10-00, P. Block 301).

(2)Leakage rate check

(a)For each position of isolation valves, perform actions shown on following chart and compare leakage rate recorded with corresponding permissible leakage rate.

NOTE : In each configuration, wait for pressure and flow to stabilize before taking measurements with flowmeter.

(b)On overhead panel

Engage YAW DAMPER 1 (Ref. 22-26-00, P. Block 501, Para. 1.A. up to and including (3)(b), action (1)).

MAXIMUM PERMISSIBLE LEAKAGE RATE-BLUE SYSTEM :
17.6 l/mn (1073.6 in^3/mn) (Left or Right).
. If the Maximum Permissible Leakage Rate is above 17.6 l/mn, check subsections to find the cause.
. If the Maximum Permissible Leakage Rate is below or equal to 17.6 l/mn, no action is necessary.

(c)Flow rate Q1

(Ref. Fig. 610)

NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

1 In flight compartment, on panel 428VU, make certain that Blue servo controls pushbutton switch is pressed (in).

2 In hydraulics compartment, place Blue system isolation valves in the following configuration : F, G, H closed.

NOTE : measurements must be taken with aileron control wheel in full left or full right position.

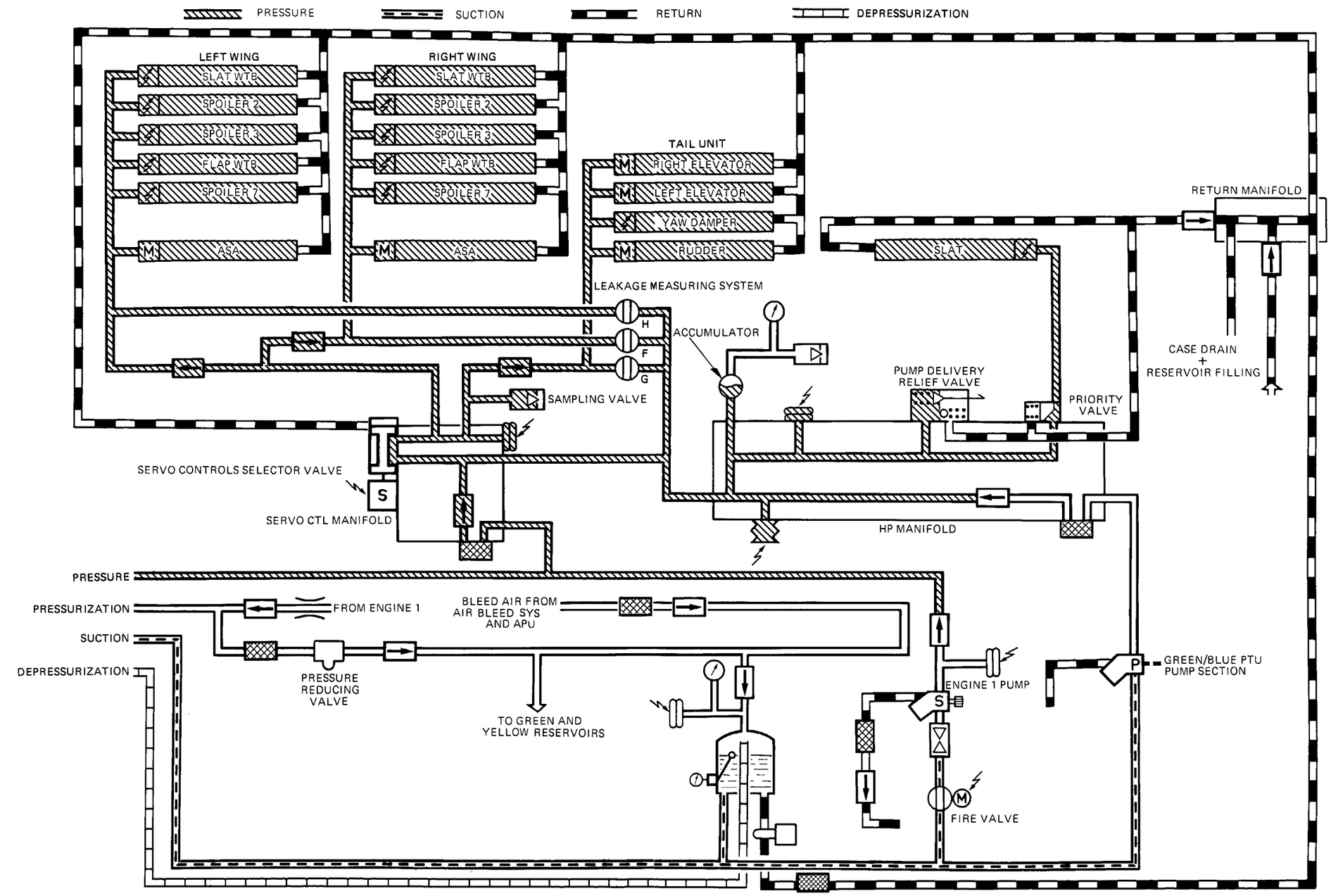
COMPONENTS	MAX. PERMISSIBLE LIMIT
2 All speed aileron servo controls	4 l/mn (244 in^3/mn)
2 elevator servo controls	5 l/mn (305 in^3/mn)
1 rudder servo control	2.5 l/mn (153 in^3/mn)
4 wing tip brakes	negligible
1 slat power control unit motor	0.22 l/mn (13.4 in^3/mn)
6 spoiler servo controls	6 l/mn (366 in^3/mn)
Miscellaneous (Yaw Damper)	1 l/mn (61 in^3/mn)

FLOW RATE CHART

POSITION OF ISOLATION VALVES	ACTION	FLOW RATE MEASURED	SUBSECTIONS CONCERNED BY FLOW RATE MEASURED	SUBSECTION FLOW RATE DEDUCTED FROM FLOW RATE MEASURED
F CLOSED G CLOSED H CLOSED	1. - SERVO CONTROLS SELECTOR VALVE SELECTED OPEN - AILERON CONTROL WHEEL TURNED FULL LEFT OR FULL RIGHT	Q1 LEFT Q1 RIGHT	TOTAL Q EITHER Q1 LEFT OR Q1 RIGHT	
F CLOSED G CLOSED H CLOSED	2. - SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE	Q2	Q DOWNSTREAM OF HP MANIFOLD	Q AT FLIGHT CONTROLS = Q2
F CLOSED G OPEN H CLOSED	3. SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE	Q3	Q2 + Q AT TAIL UNIT	Q AT TAIL UNIT = Q3–Q2
F CLOSED G CLOSED H OPEN	4. - SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE - AILERON CONTROL WHEEL TURNED FULL LEFT	Q4	Q2 + Q AT L WING	Q AT L WING = Q4–Q2
F OPEN G CLOSED H CLOSED	5. - SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE - AILERON CONTROL WHEEL TURNED FULL RIGHT	Q5	Q2 + Q AT R WING	Q AT R WING = Q5–Q2

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Flow Rate Chart
Figure 609



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Leakage Measurement Diagram (Flow Rate Q1 - Blue System)
Figure 610

3 Measure leakage
NOTE : The M.P.L.R of the BLue sytem is 17.6 l/mn (1073.6 in³/mn).

(d)Flow rate Q2
(Ref. Fig. 611)
NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.
1 In flight compartment, on panel 428VU, release Blue servo controls pushbutton switch.
2 In hydraulics compartment, make certain that Blue system isolation valves are in the following configuration : F, G, H closed.
NOTE : measured flow rate is the leakage rate of components located downstream of HP manifold.

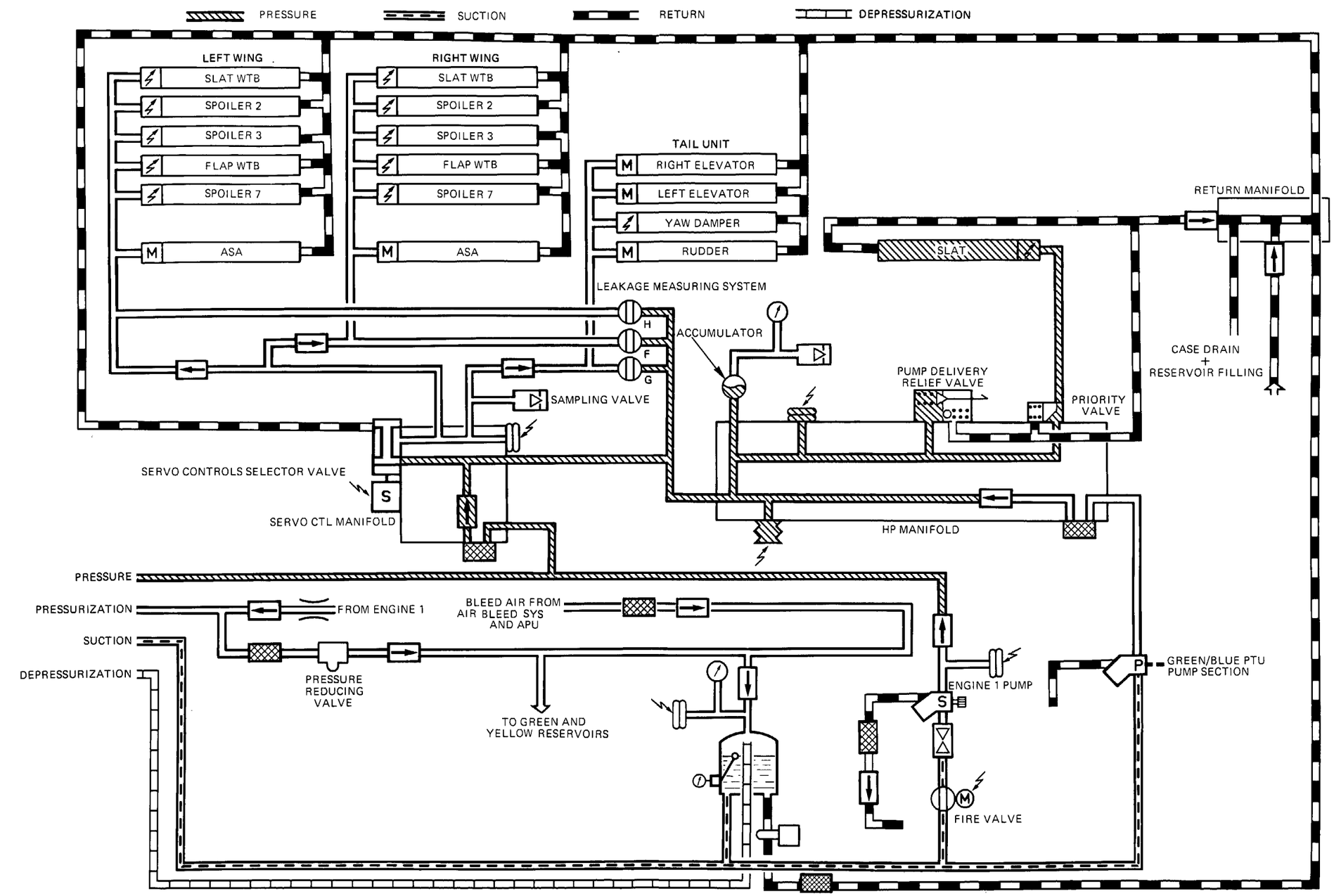
COMPONENTS	MAX. PERMISSIBLE LIMIT
1 slat power control unit motor	0.22 l/mn (13.4 in³/mn)

3 Measure leakage
NOTE : - The M.P.L.R. of subsection Q2 is 0.25 l/mn (15.3 in³/mn).
- If the M.P.L.R. of subsection Q2 is exceeded, facilitate identification of the faulty component using method described in para. 3.D.(3).
If slat P.C.U. is within its max. permissible limit check the other hydraulic components not isolated during the leakage measurement of Q2 subsection and for which internal leakage is considered negligible.
4 Restore system to normal operating condition.

(e)Flow rate Q3
(Ref. Fig. 612)
NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.
1 In flight compartment, on panel 428VU, make certain that Blue servo controls pushbutton switch is released (out).
2 Make certain that YAW DAMPER 1 is still engaged (Ref. 22-26-00, P. Block 501 Para. 1.A. up to and including (3) (b) action (1)).
3 In hydraulics compartment, place Blue system isolation valves in the following configuration :
G open and F, H closed.
NOTE : measured flow rate is the leakage rate of components located in tail unit and downstream of HP manifold.

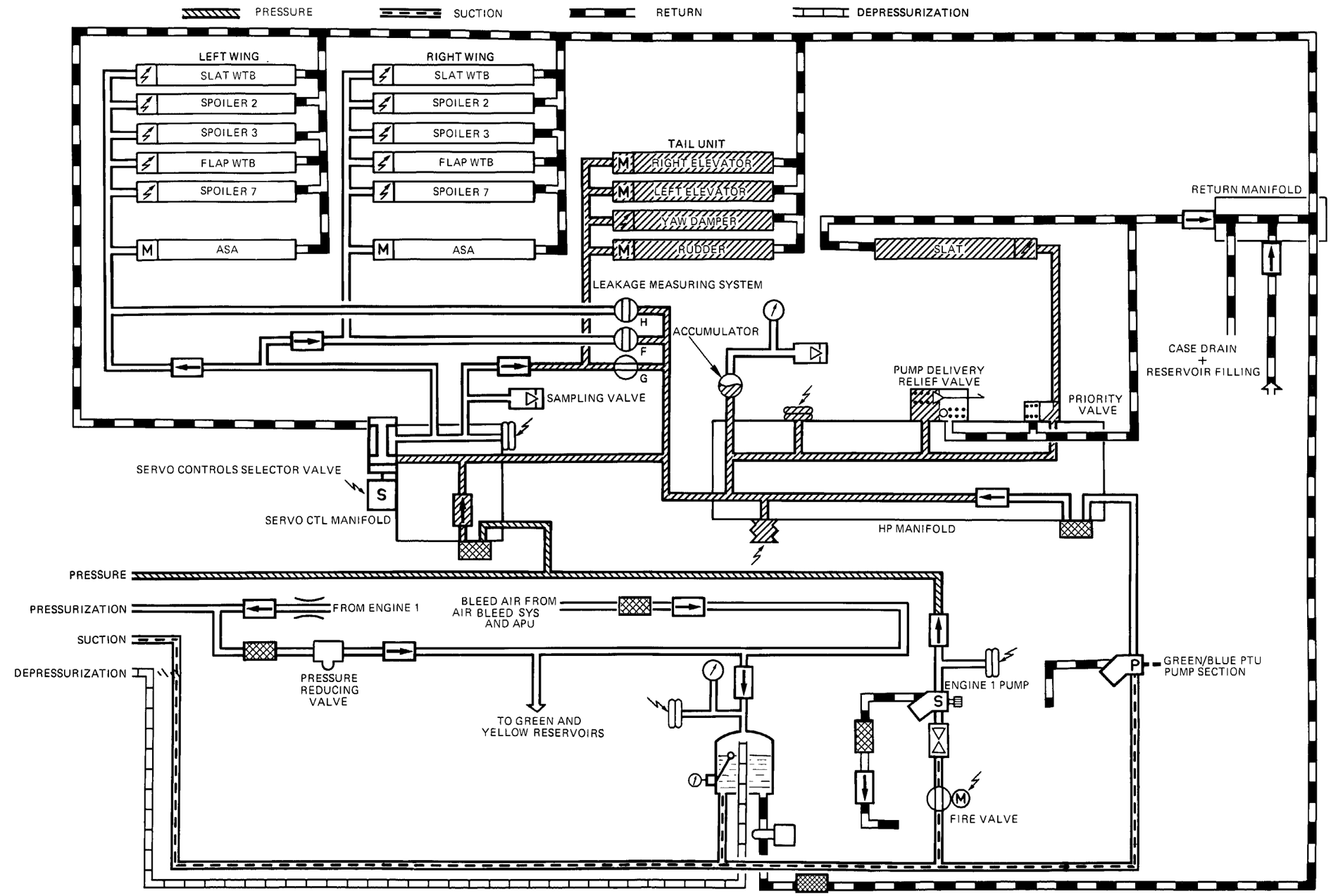
COMPONENTS	MAX. PERMISSIBLE LIMIT
2 Elevator servo controls	5 l/mn (305 in³/mn)
1 Rudder servo control	2.5 l/mn (153 in³/mn)
1 Slat control unit motor	0.22 l/mn (13.4 in³/mn)
Miscellaneous (Yaw Damper)	1 l/mn (61 in³/mn)

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Leakage Measurement Diagram (Flow Rate Q2 - Blue System)
Figure 611



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Leakage Measurement Diagram (Flow Rate Q3 - Blue System)
Figure 612

4 Measure leakage
NOTE : - If Q1 value is below or equal to the M.P.L.R. of system i.e 17.6 l/mn (1073 in³/mn), the M.P.L.R. of subsection Q3 is 8.5 l/mn (518.5 in³/mn) + Q2.
- If Q1 value exceeds the M.P.L.R. of system i.e 17.6 l/mn (1073 in³/mn), the M.P.L.R. of subsection Q3 is 7.35 l/mn (448.4 in³/mn) + Q2.
- In both cases, if nominal flow rate Q3 exceeds the relevant M.P.L.R., identify the faulty component using method described Para. 3.D.(3).

5 Restore system to normal operating condition.
- Disengage YAW DAMPER 1 (Ref. 22-26-00, P. Block 501).

(f)Flow rate Q4
(Ref. Fig. 613)
NOTE : On leakage measurement diagram the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

1 On overhead panel, on panel 428VU, make certain that Blue servo controls pushbutton switch is released (out).
2 In hydraulics compartment, place Blue system isolation valves in the following configuration : H open and F, G closed.
3 Make certain that aileron control wheel is in full left position.
NOTE : Measured flow rate is the leakage rate of components located in left wing and downstream of the HP manifold.

COMPONENTS	MAX. PERMISSIBLE LIMIT
1 All speed aileron servo control	2 l/mn (122 in³m/mn)
2 Wing tip brakes	Negligible
3 spoiler servo controls	3 l/mn (183 in³/mn)
1 slat power control unit motor	0.22 l/mn (13.4 in³/mn)

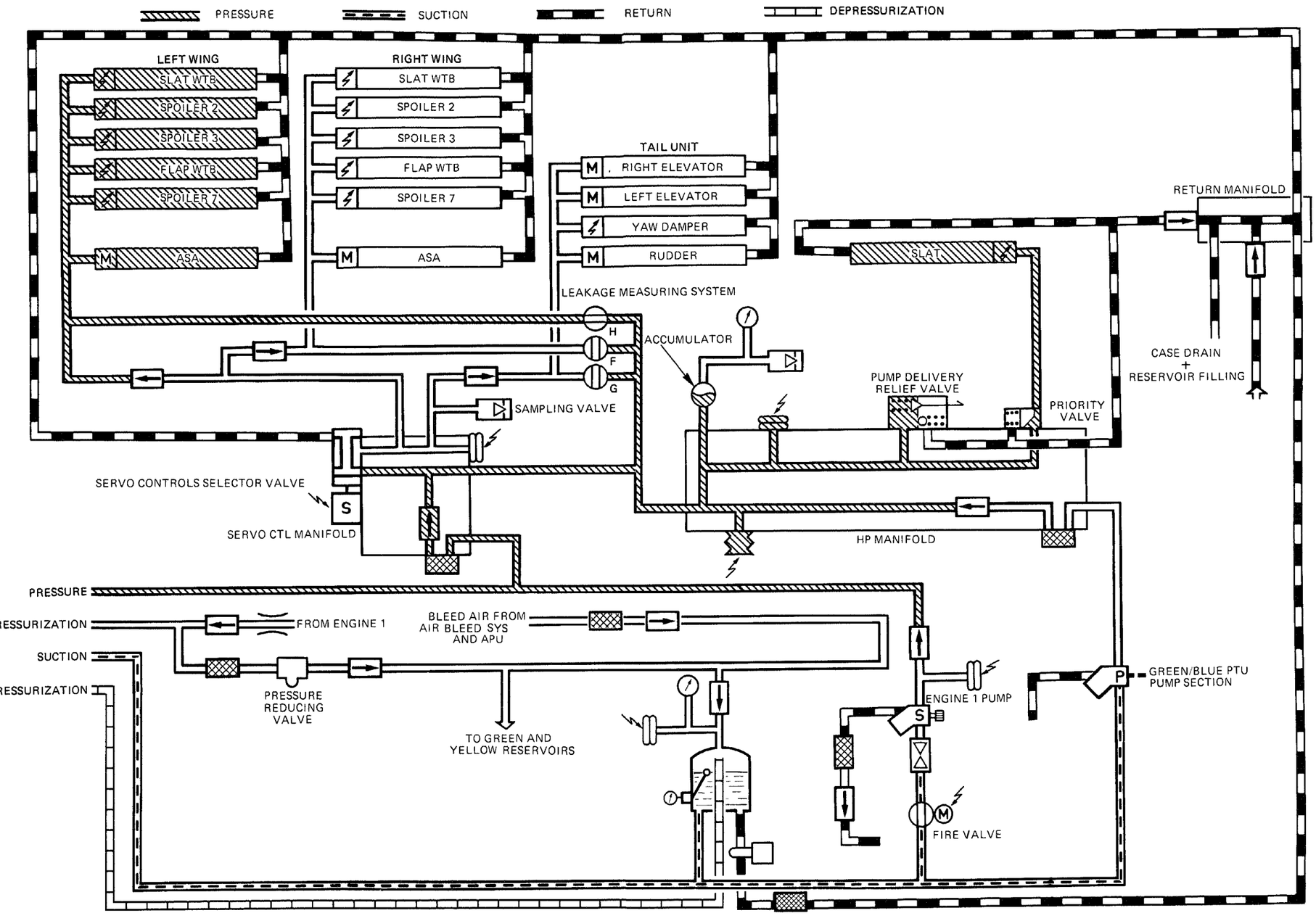
4 Measure leakage
NOTE : The M.P.L.R. of subsection Q4 is 5l/mn (305 in³/mn) + Q2. If the M.P.L.R. of subsection Q4 is exceeded, facilitate identification of the faulty component using method described in Para. 3.D.(3).

5 Restore system to normal operating condition.

(g)Flow rate Q5
(Ref. Fig. 614)
NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

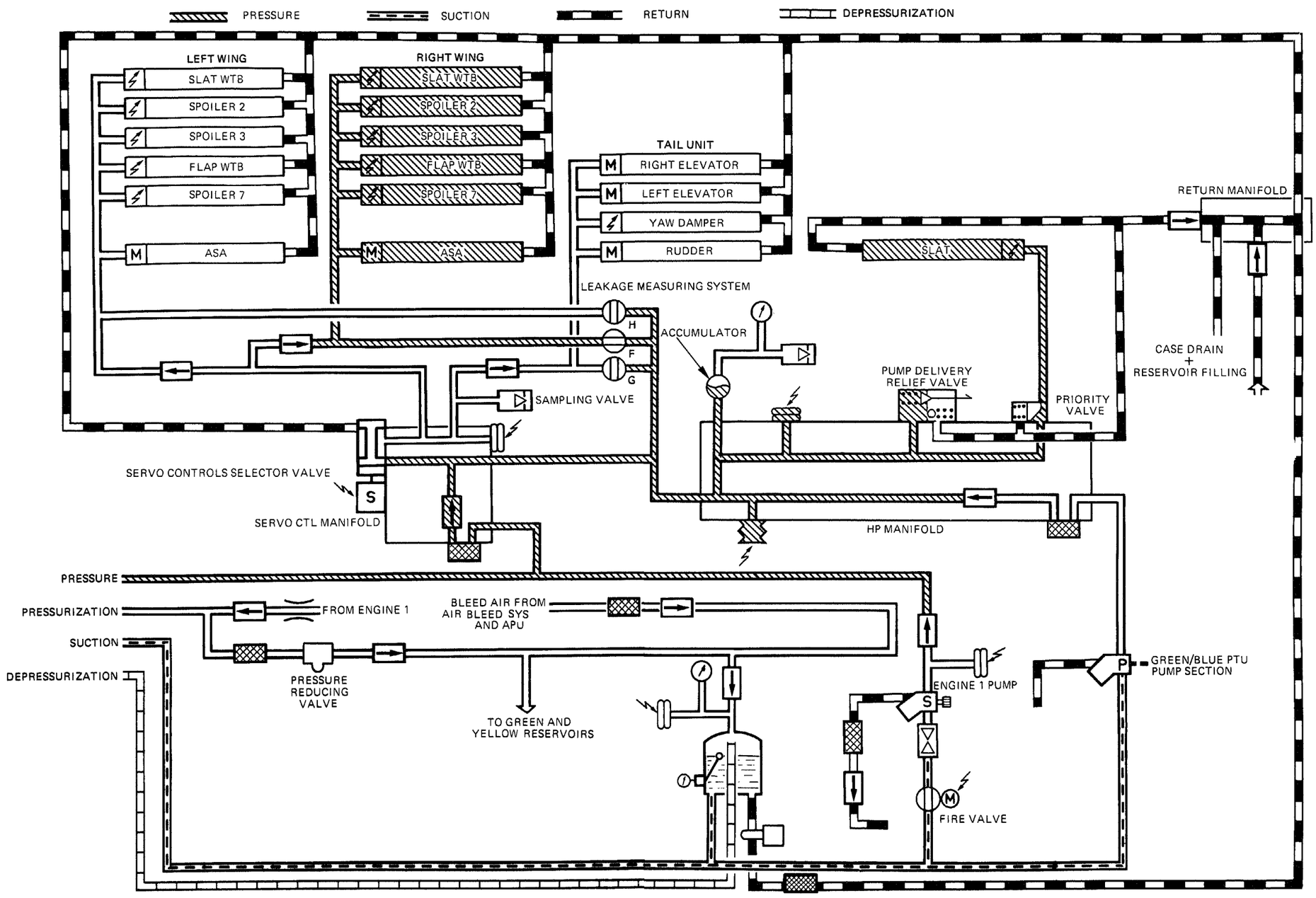
1 On overhead panel, on panel 428VU, make certain that Blue servo controls pushbutton switch is released (out).
2 In hydraulics compartment, place Blue system isolation valves in the following configuration. F open and G, H closed.
3 Make certain that aileron control wheel is in full right position.
NOTE : Measured flow rate is the leakage rate of components located in right wing and downstream of HP manifold.

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Leakage Measurement Diagram (Flow Rate Q4 - Blue System)
Figure 613



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Leakage Measurement Diagram (Flow Rate Q5 - Blue System)
Figure 614

COMPONENTS	MAX. PERMISSIBLE LIMIT
1 All speed aileron servo control	2 l/mn (122 in³/mn)
2 wing tip brakes	Negligible
3 spoiler servo controls	3 l/mn (183 in³/mn)
1 slat power control unit motor	0.22 l/mn (13.4 in³/mn)

4 Measure leakage
NOTE : The M.P.L.R. of subsection Q5 is 5 l/mn (305 in³/mn) +Q2. If the M.P.L.R. of subsection Q5 is exceeded, facilitate identification of the faulty component using method described in Para. 3.D.(3).
5 Restore system to normal operating condition.

(3)Blue system flow rate measurement close-up
(a)In hydraulics compartment, close the three Blue system isolation valves.
(b)In flight compartment, on panel 428VU, press Blue servo controls push-button switch.
(c)With Blue system pressurized, successively operate the following controls :
- elevator
- rudder
- aileron

Extend then retract slats
Make certain that components considered deflect and operate normally.

G. Yellow System Testing
(Ref. Fig. 615)
NOTE : On Yellow System Isolation Valves :
- Letter F is associated with Left Wing
- Letter G is associated with Tail Unit
- Letter H is associated with Right Wing

(1)Job set-up
(a)Check that yellow system pressure is 3000 psi (206 bars) then shut down hydraulic ground power cart.
(b)Check pump delivery relief valve 293063 and 293067 for internal leakage, either aurally, or by feel (vibrations).
(c)Pressurize Yellow system again to 3000 psi (206 bars). (Ref. 29-10-00, P. Block 301).

(2)Leakage rate check
NOTE : Compared with Green and Blue hydraulic system, the nominal internal flow rates for Yellow subsections (Q3, Q4, Q5) are more restrictive in order to take into account Ram Air Turbine utilization which is an ultimate emergency hydraulic power with flow capacity of only 45 l/mn.
(a)For each position of isolation valves, perform actions shown on following chart and compare leakage rate recorded with corresponding permissible rate.
NOTE : For each configuration, wait for pressure and leakage to stabilize before taking measurements with flowmeter.

FLOW RATE CHART

POSITION OF ISOLATION VALVES	ACTION	FLOW RATE MEASURED	SUBSECTIONS CONCERNED BY FLOW RATE MEASURED	SUBSECTION FLOW RATE DEDUCTED FROM FLOW RATE MEASURED
F CLOSED G CLOSED H CLOSED	1. - SERVO CONTROLS SELECTOR VALVE SELECTED OPEN - AILERON CONTROL WHEEL TURNED FULL LEFT OR FULL RIGHT	Q1 LEFT Q1 RIGHT	TOTAL Q EITHER Q1 LEFT OR Q1 RIGHT	
F CLOSED G CLOSED H CLOSED	2. - SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE	Q2	Q DOWNSTREAM OF HP MANIFOLD	Q AT FLIGHT CONTROLS = Q2
F CLOSED G OPEN H CLOSED	3. SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE	Q3	Q2 + Q AT TAIL UNIT	Q AT TAIL UNIT = Q3–Q2
F OPEN G CLOSED H CLOSED	4. - SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE - AILERON CONTROL WHEEL TURNED FULL LEFT	Q4	Q2 + Q AT L WING	Q AT L WING = Q4–Q2
F CLOSED G CLOSED H OPEN	5. - SERVO CONTROLS SELECTOR VALVE SELECTED CLOSE - AILERON CONTROL WHEEL TURNED FULL RIGHT	Q5	Q2 + Q AT R WING	Q AT R WING = Q5–Q2

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Flow Rate Chart
Figure 615

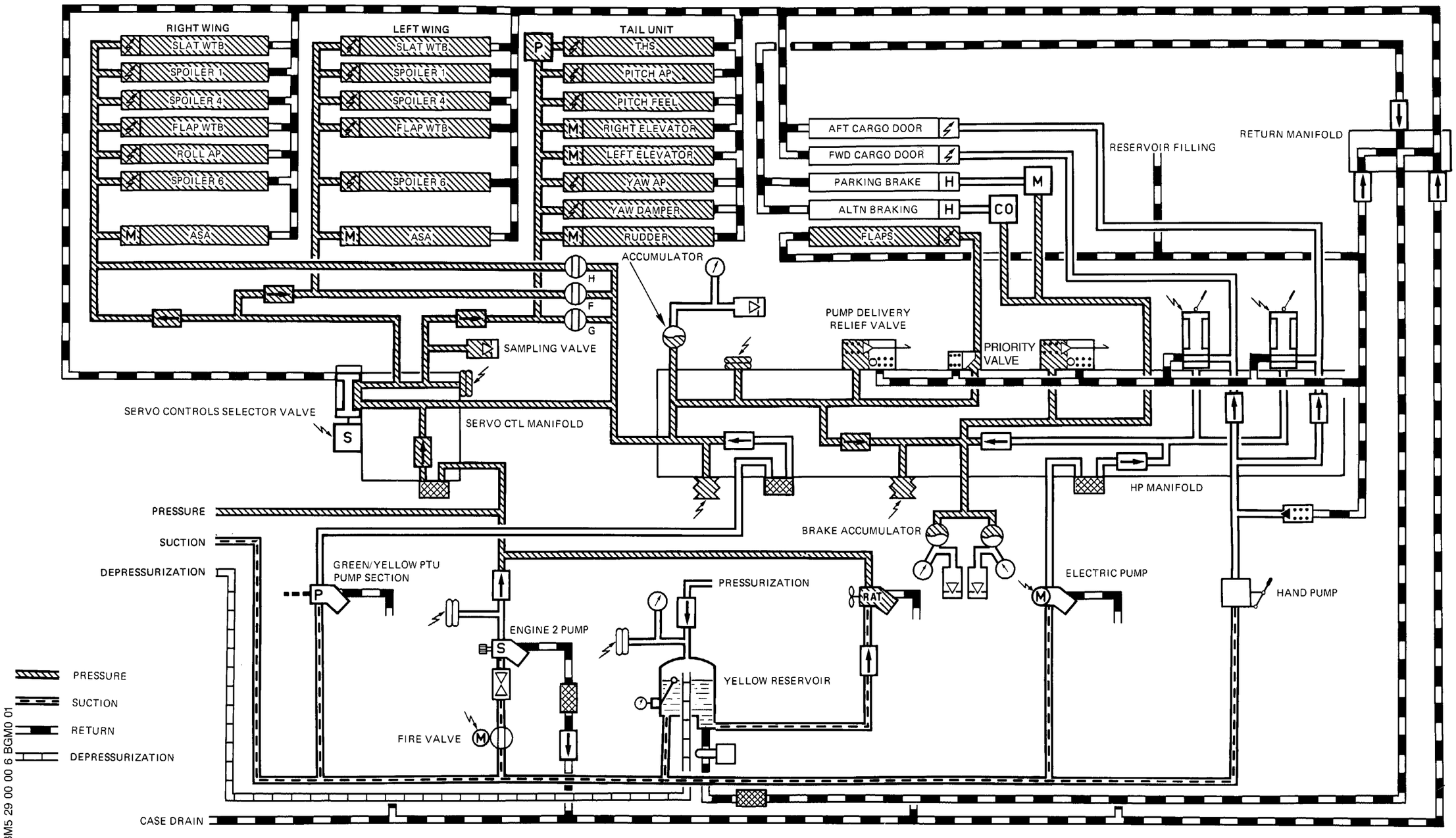
(b)On PITCH FEEL section of panel 428VU, make certain that SYS 2 push-button switch is pressed (in).
NOTE : Align IRS 1/2/3 to prepare engagement of YAW DAMPER 2 (Ref. 34-25-00, P. Block 501).
MAXIMUM PERMISSIBLE LEAKAGE RATE-YELLOW SYSTEM :
18.500 l/mn (1128.5 in³/mn) (Left or Right).
. If the Maximum Permissible Leakage Rate is above 18.5 l/mn (1125.5 in³/mn), check subsections to find the cause.
. If the Maximum Permissible Leakage Rate is below or equal to 18.5 l/mn (1125.5 in³/mn), no action is necessary.

(c)Flow rate Q1
1 In flight compartment, on panel 428VU, make certain that Yellow servo controls pushbutton switch is pressed (in).
2 In hydraulics compartment, place Yellow system isolation valves in the following configuration : F, G, H closed.
3 Engage YAW DAMPER 2 (Ref. 22-26-00, P. Block 501 Para. 1.A. up to and including (3)(b) action (1)).
NOTE : measurements must be taken with aileron control wheel in full left or full right position.

COMPONENTS	MAX. PERMISSIBLE LIMIT
2 All speed aileron servo controls	4 l/mn (244 in³/mn)
2 elevator servo controls	5 l/mn (305 in³/mn)
1 rudder servo control	2.5 l/mn (153 in³/mn)
4 wing tip brakes	Negligible
6 spoiler servo controls	6 l/mn (366 in³/mn)
1 THS actuator motor	1.5 l/mn (92 in³/mn)
1 flap power control unit motor	0.22 l/mn (13.4 in³/mn)
Miscellaneous (Yaw AP, Pitch AP, Roll AP, Pitch feel, Yaw Damper)	5 l/mn (305 in³/mn)
1 Ram Air Turbine	2 l/mn (122 in³/mn)

4 Leakage measurement with PITCH TRIM 1 and 2, AUTO PILOT 2, PITCH FEEL SYS 2 and YAW DAMPER 2 engaged :
(Ref. Fig. 616)
NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.
- On overhead Panel on PITCH FEEL section of panel 428VU, make certain that PITCH FEEL SYS 2 (Ref. 27-33-00, P. Block 501) is still engaged.
- Engage PITCH TRIM 1 and 2 (Ref. 22-27-00, P. Block 501, Para. 1.A. up to and including (3)(b), action (1)).
- Engage YAW DAMPER 2 (Ref. 22-26-00, P. Block 501 Para. 1.A. up to and up to and including (3)(b) action (1)).
- Engage AUTO PILOT 2 (Ref. 22-10-00, P. Block 501, Para. 1.C., A.P Test in CMD Mode).
NOTE : Perform engagement procedure up to and including the

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Leakage Measurement Diagram (Flow Rate Q1 - Yellow System)
Figure 616

following actions of 1.C.(3).(b).1. :
- Place AP2 lever in ON position.
- Press CWS/CMD pushbutton switch (CMD legend comes on)

- Measure leakage
  NOTE : The MPLR of the yellow system is 18.5 l/mn (1128.5 in³/mn).
- Disengage PITCH TRIM 1 and 2 (Ref. 22-27-00, P. Block 501).
- On glareshield, on FCU, disengage AUTO PILOT 2 (Ref. 22-10-00, P. Block 501).

5 Leakage measurement with PITCH FEEL SYS 2 and YAW DAMPER 2 engaged and AUTO PILOT 2 disengaged :
NOTE : The purpose of this leakage measurement (AUTO PILOT 2 disengaged) is only to allow AUTO PILOT LEAKAGE RATE determination by comparison between the flow rate recorded in Para. 4 and the one measured in this paragraph.
- Engage PITCH TRIM 2 (Ref. 22-27-00, P. Block 501, Para. 1.A. up to and including (3)(b), action (1)).
- Engage YAW DAMPER 2 (Ref. 22-26-00, P. Block 501, Para. 1.A. up to and including (3)(b), action (1)).
- On overhead panel on PITCH FEEL section of panel 428VU, make certain that PITCH FEEL SYS2 (Ref. 27-33-00, P. Block 501) is still engaged.
- On overhead panel make certain that YAW DAMPER 2 (Ref. 22-26-00, P. Block 501) is still engaged.
- Open, safety and tag following circuit breaker : 306CA2.

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/AP2-FD2/FCC2/28VDC	306CA2	102/H6

- Measure leakage
  NOTE : If the difference between the flow rate value recorded in Para. 4 and the one measured in this paragraph exceeds 3 l/mn (183 in³/mn), it is necessary to check AUTO PILOT for excessive internal leakage.

6 Restore system to normal operating condition.

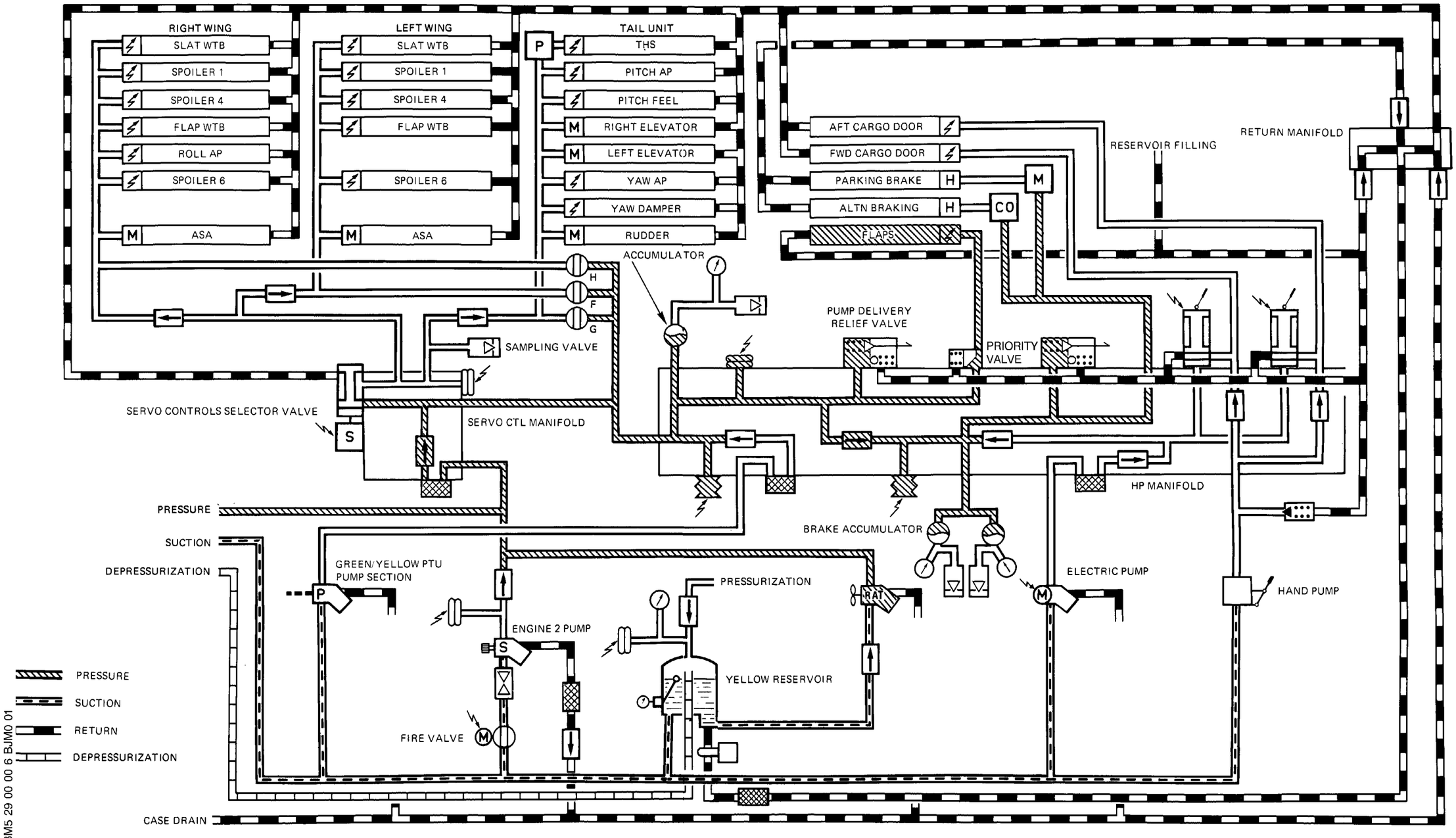
(d)Flow rate Q2
(Ref. Fig. 617)
NOTE : On leakage measurement diagram the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

1 In flight compartment, on panel 428VU, release Yellow servo controls pushbutton switch.

2 In hydraulics compartment, make certain that Yellow system isolation valves are in the following configuration : F, G, H closed.
NOTE : measured flow rate is the leakage rate of Ram Air Turbine and components located downstream of HP manifold.

COMPONENTS	MAX. PERMISSIBLE LIMIT
1 Flap power control unit motor	0.22 l/mn (13.4 in³/mn)
1 Ram Air Turbine	2 l/mn (122 in³/mn)

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Leakage Measurement Diagram (Flow Rate Q2 - Yellow System)
Figure 617

3 Measure leakage
NOTE : - The M.P.L.R. of subsection Q2 is 2.25 l/mn (137.25 in³/mn).
- If the M.P.L.R. of subsection Q2 is exceeded facilitate identification of the faulty component using method described in para. 3.D.(3).

If flap PCU and Ram Air Turbine are within their max. permissible limit, check the other hydraulic components not isolated during the leakage measurement of Q2 subsection and for which internal leakage is negligible.

4 Restore system to normal operating condition.

(e)Flow rate Q3
(Ref. Fig. 618)

NOTE : On leakage measurement diagram the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

1 In flight compartment, on panel 428VU, make certain that Yellow servo controls pushbutton switch is released (out).

2 In hydraulics compartment, place Yellow system isolation valves in the following configuration : G open and F, H closed.

3 On overhead panel, make certain that PITCH FEEL SYS 2 (Ref. 27-33-00, P. Block 501) is engaged.

4 On overhead panel, make certain that YAW DAMPER 2 (Ref. 22-26-00, P. Block 501) is engaged.

NOTE : measured flow rate is the leakage rate of Ram Air Turbine and components located in tail cone and downstream of HP manifold.

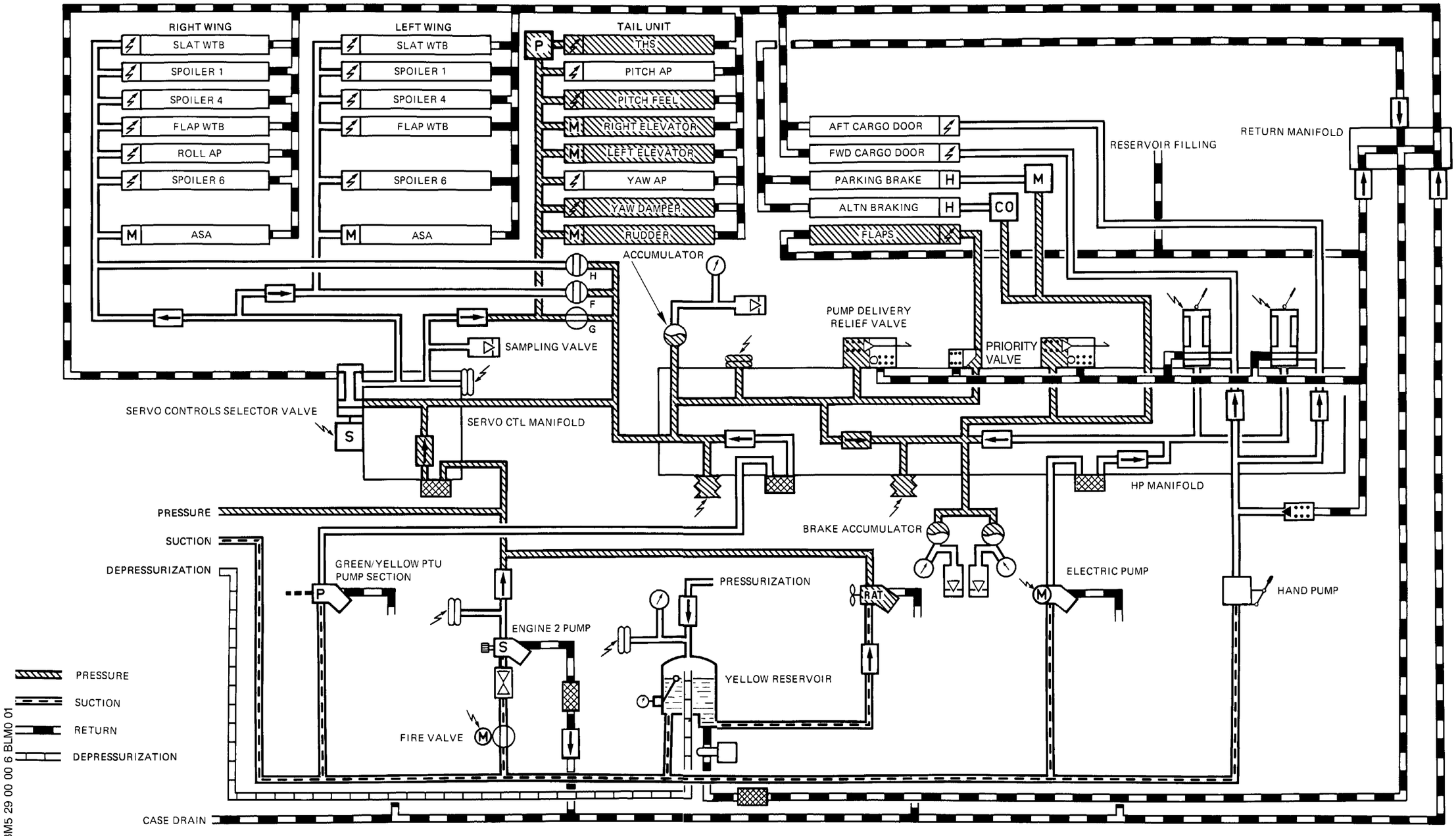
COMPONENTS	MAX. PERMISSIBLE LIMIT
2 Elevator servo controls	5 l/mn (305 in³/mn)
1 rudder servo control	2.5 l/mn (153 in³/mn)
1 THS actuator motor	1.5 l/mn (92 in³/mn)
1 flap power control unit motor	0.22 l/mn (13.4 in³/mn)
Miscellaneous (Pitch Feel, Yaw Damper)	2 l/mn (122 in³/mn)
Ram Air Turbine	2 l/mn (122 in³/mn)

5 Measure leakage :
NOTE : - If Q1 value is below or equal to the M.P.L.R. of system i.e 18.5 l/mn (1128.5 in³/mn) the M.P.L.R. of subsection Q3 is 11 l/mn (671 in³/mn) + Q2.
- If Q1 value exceeds the M.P.L.R. of system i.e 18.5 l/mn (1128.5 in³/mn) the M.P.L.R. of subsection Q3 is 6.25 l/mn (381.3 in³/mn) + Q2.
- In both cases, if flow rate Q3 exceeds the relevant M.P.L.R. identify the faulty component using method described in Para. 3.D.(3).

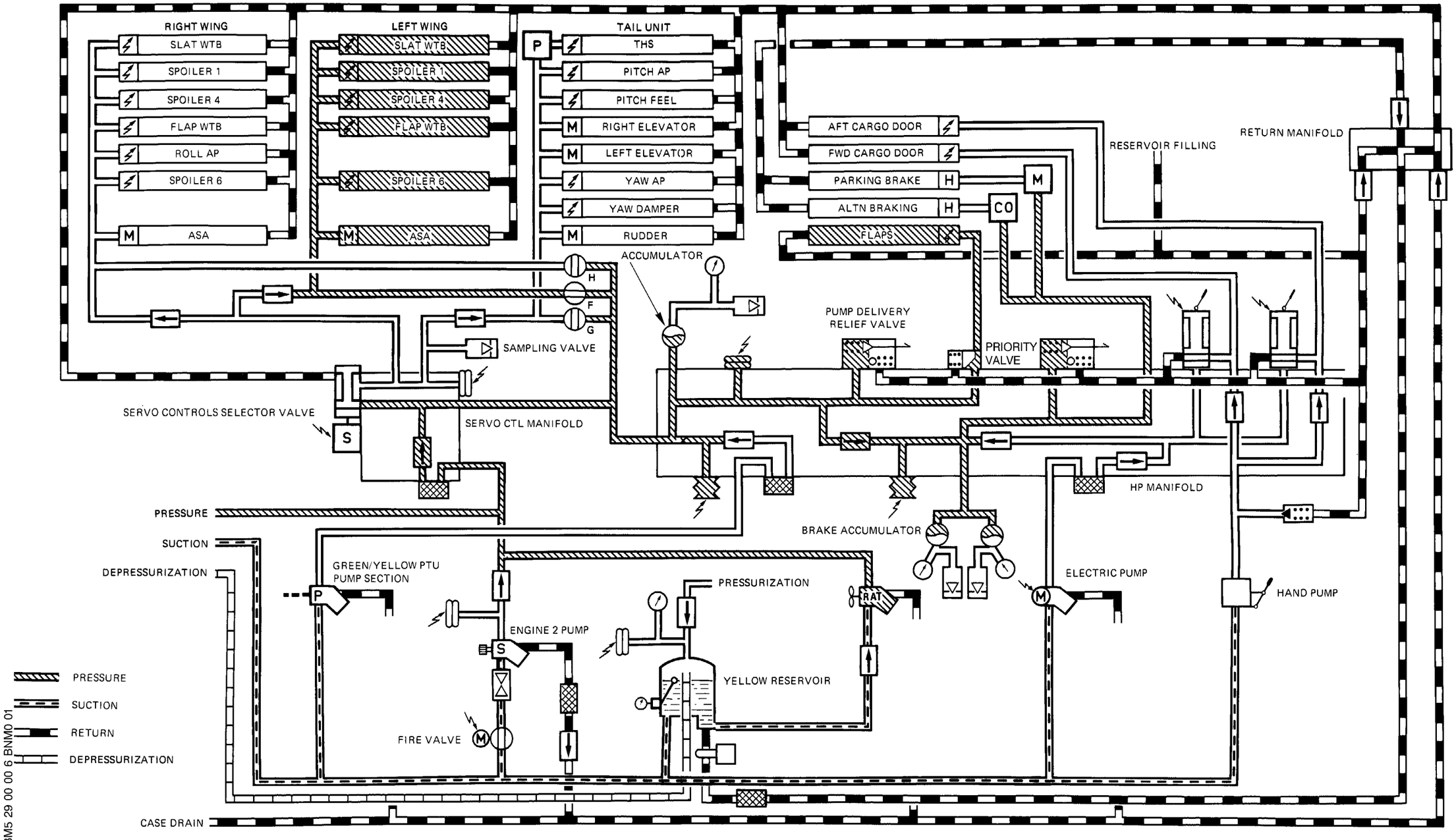
6 Restore system to normal operating condition.
- Disengage YAW DAMPER 2 (Ref. 22-26-00, P. Block 501).

(f)Flow rate Q4
(Ref. Fig. 619)

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Leakage Measurement Diagram (Flow Rate Q3 - Yellow System)
Figure 618



Leakage Measurement Diagram (Flow Rate Q4 - Yellow System)
Figure 619

NOTE : On leakage measurement diagram the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

1 On overhead panel, on panel 428VU :
Make certain that Yellow servo controls pushbutton switch is released (out).

2 In hydraulics compartment, place Yellow system isolation valves in the following configuration : F open and G, H closed.

3 Make certain that aileron control wheel is in full left position.
NOTE : measured flow rate is the leakage rate of Ram Air Turbine and components located in left wing and downstream of HP manifold.

COMPONENTS	MAX. PERMISSIBLE LIMIT
1 All speed aileron servo control	2 l/mn (122 in³/mn)
2 wing tip brakes	Negligible
3 spoiler servo controls	3 l/mn (183 in³/mn)
1 flap power control unit motor	0.22 l/mn (13.4 in³/mn)
1 Ram Air Turbine	2 l/mn (122 in³/mn)

4 Measure leakage
NOTE : - If Q1 value is below or equal to the M.P.L.R. of system i.e 18.5 l/mn (1128.5 in³/mn) the M.P.L.R. of subsection Q4 is 5 l/mn (305 in³/mn) + Q2.
- If Q1 value exceeds the M.P.L.R. of system i.e 18.5 l/mn (1128.5 in³/mn) the M.P.L.R. of subsection Q4 is 3.5 l/mn (213.5 in³/mn) + Q2.
- In both cases, if flow rate Q4 exceeds the relevant M.P.L.R. identify the faulty component using method described in Para. 3.D.(3).

5 Restore system to operating condition.

(g)Flow rate Q5
(Ref. Fig. 620)
NOTE : On leakage measurement diagram, the shaded areas represent components on which internal leakage is measured according to servo controls selector valve and isolation valves position.

1 On overhead panel, on panel 428VU, make certain that Yellow servo controls pushbutton switch is released (out).

2 In hydraulics compartment, place Yellow system isolation valves in the following configuration : H open and F, G closed.

3 Make certain that aileron control wheel is in full right position.
NOTE : measured flow rate is the leakage rate of Ram Air Turbine and components located in right wing and downstream of HP manifold.

COMPONENTS	MAX. PERMISSIBLE LIMIT
1 All speed aileron servo control	2 l/mn (122 in³/mn)
3 spoiler servo controls	3 l/mn (183 in³/mn)
2 wing tip brakes	Negligible

COMPONENTS	MAX. PERMISSIBLE LIMIT
1 flap power control unit motor	0.22 l/mn (13.4 in³/mn)
1 Ram Air Turbine	2 l/mn (122 in³/mn)

4 Measure leakage :

NOTE : - If Q1 value is below or equal to the M.P.L.R. of system i.e 18.5 l/mn (1128.5 in³/mn), the M.P.L.R. of subsection Q5 is 5 l/mn (305 in³/mn) + Q2.
- If Q1 value exceeds the M.P.L.R. of system i.e 18.5 l/mn (1128.5 in³/mn) the M.P.L.R. of subsection Q5 is 3.5 l/mn (213.5 in³/mn) + Q2.
- In both cases, if flow rate Q5 exceeds the relevant M.P.L.R., identify the faulty component using method described in Para. 3.D.(3).

5 Restore system to normal operating condition.

(3)Yellow system flow rate measurement close-up

(a)In hydraulics compartment, close the three Yellow system isolation valves.

(b)In flight compartment, on panel 428VU, press Yellow servo controls pushbutton switch.

(c)Remove tag and close circuit breaker :

(d)With Yellow system pressurized, successively operate the following controls :
- elevator
- rudder
- aileron

Extend and retract flaps.

Make certain that components considered deflect and operate normally.

H. Close-Up

(1)Restore aircraft to normal operating condition

(a)Disconnect hydraulic ground power cart.

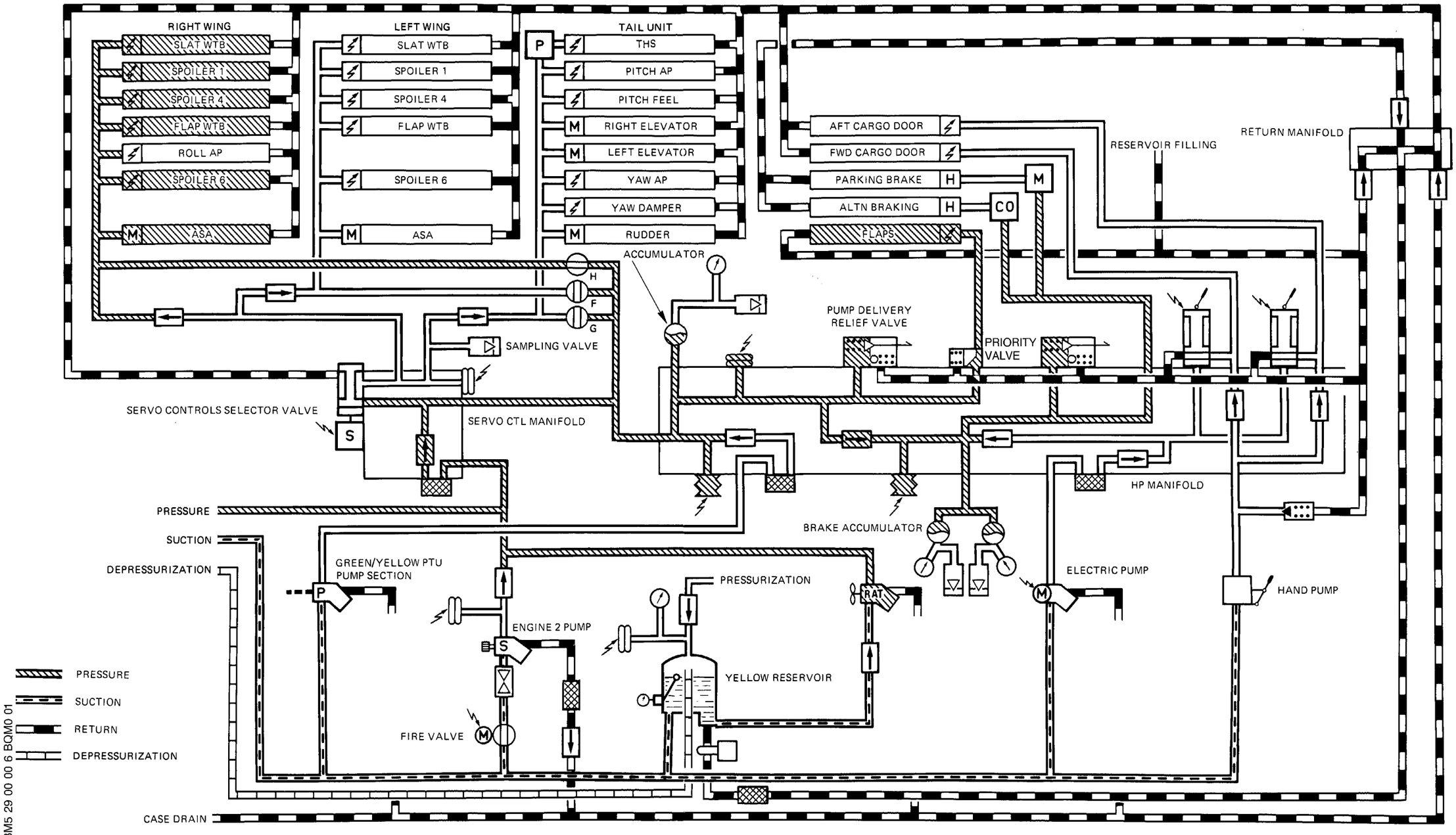
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Check fluid level in hydraulic reservoirs ; top up as required (Ref. 12-12-29, P. Block 1).

(d)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, and miscellaneous items.

(e)Close left main gear door (Ref. 32-12-11, P. Block 301).

(f)Remove all access equipment.



Leakage Measurement Diagram (Flow Rate Q5 - Yellow System)
Figure 620

4. Check of the Nitrogen Charging Pressure on Hydraulic Power Accumulator (1070, 2070, 3070)

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Warning Notices
Referenced Procedures	
- 12-14-29, P. Block 1	Nitrogen Charging of Hydraulic Accumulators
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-11-56, P. Block 401	Accumulator
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

(1)Job set-up

(a)On panel 427VU:

- Display a warning notice prohibiting operation of Green, Blue or Yellow system.

(b)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B8
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(c)Open access doors 147AL, 571DB and 671DB to hydraulic ground connectors.

(d)Open main landing gear doors (Ref. 32-12-11, P. Block 301).

(e)Depressurize Green, Blue or Yellow hydraulic reservoir, as appropriate (Ref. 29-14-00, P. Block 301).

(f)Display a warning notice on ground connectors prohibiting pressurization of Green, Blue or Yellow system.

(g)Depressurize Green, Blue or Yellow hydraulic system (Ref. 29-10-00, P. Block 301).

(2)Check of the precharge pressure.

(a)Refer to the pressure gages on each system accumulator, and make sure that the precharge pressures are as follows :

Temperature		Charging pressure	
deg.C	deg.F	bar	PSI
-20	- 4	86	1247
-10	+14	90	1305
0	+32	93	1349
+10	+50	97	1407
+20	+68	100	1450
+30	+86	104	1508
+40	+104	107	1522
+60	+140	111	1653

NOTE : If you do this check immediately after aircraft landing, let the pressure become stable for one hour to get a more accurate measurement (temperature compensation of the accumulator).

(3)If the pressures are not correct continue as follows :

(a)If the pressure differential between the read and the nominal pressure is less than or equal to 30 bars (440 psi) :

- adjust the pressure as necessary (Ref. 12-14-29, P. Block 1).

(b)If the pressure differential is more than 30 bars (440 psi) :

- do a leak check on the following components :
  - . accumulator connections.
  - . power accumulator pressure gage.
  - . nitrogen charging valve.
  - . power accumulator.
- if possible stop any leaks and then pressurize the accumulator (Ref. 12-14-29, P. Block 1).
- if it is not possible to stop the leaks, replace the concerned components (Ref. 29-11-56, P. Block 401).
  - . power accumulator pressure gage.
  - . nitrogen charging valve.
  - . power accumulator.
- pressurize the accumulator and adjust the pressure (Ref. 12-14-29, P. Block 1).

(4)Close-up

(a)Close main landing gear doors (Ref. 32-12-11, P. Block 301).

(b)Remove the warning notices.

(c)Close the access doors.

(d)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 1GL, 6GL and 7GX.

Ref. MEL Sect. 1-29, Item 12 (Filters)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
WARNING : MAKE CERTAIN THAT RELEVANT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED BEFORE ATTEMPTING MAINTENANCE PROCEDURES ON ENGINE. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.
CAUTION : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Deactivation

A. Engine-Driven Pump Case Drain Filters (Green 1, Green 2, Blue, Yellow).
(1)Equipment and Materials

ITEM	DESIGNATION
(a)	Torque Wrench 2 to 3 m.daN (15 to 22 lbf.ft)
(b)	Hydraulic Fluid Recovery Container
(c)	Lockwire, Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in).
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 12-12-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 301	Hydraulic Power
- 71-13-00, P. Block 301	Cowl Doors

(2)Procedure

**ON A/C 101-200,

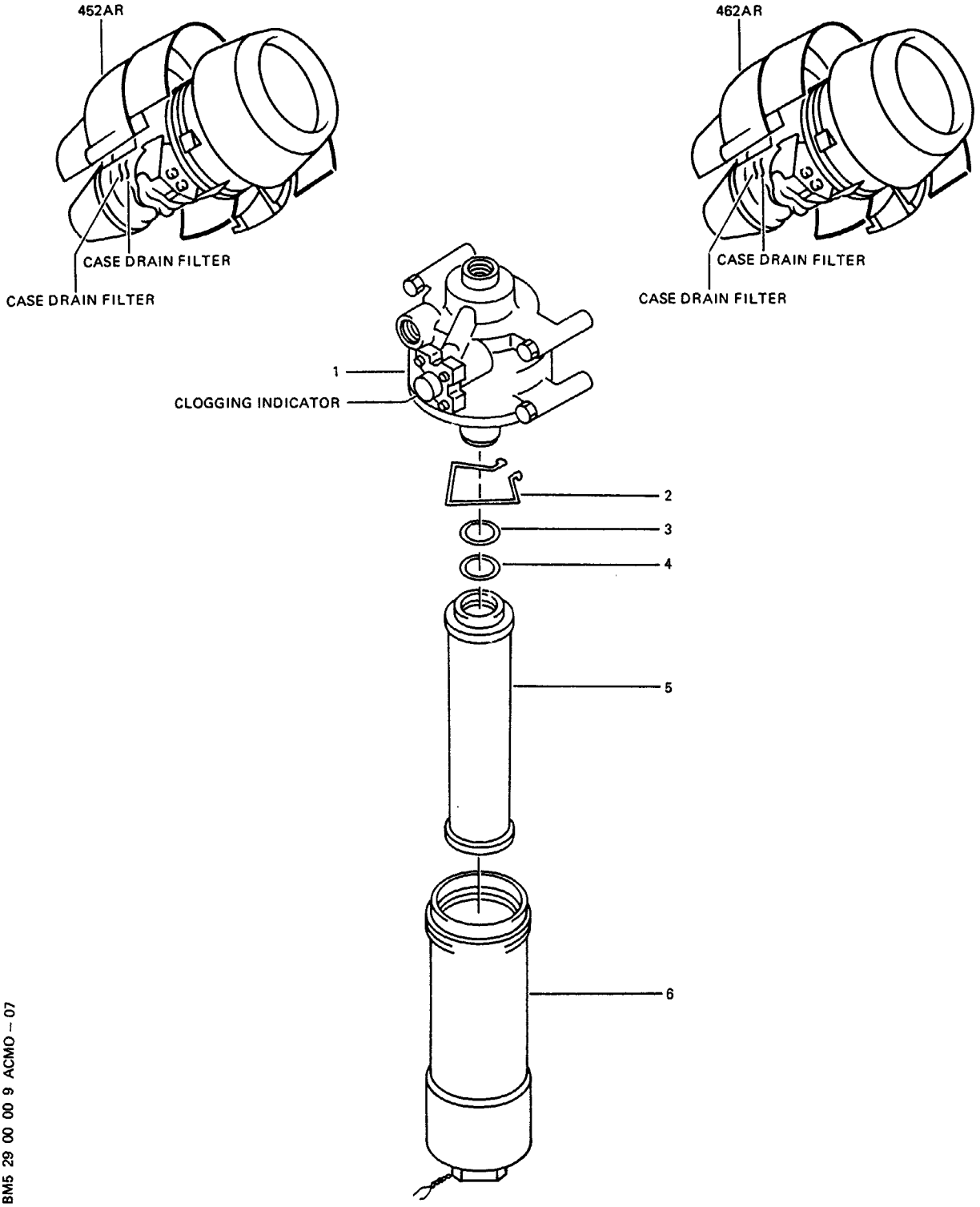
(Ref. Fig. 901)

**ON A/C 001-100,

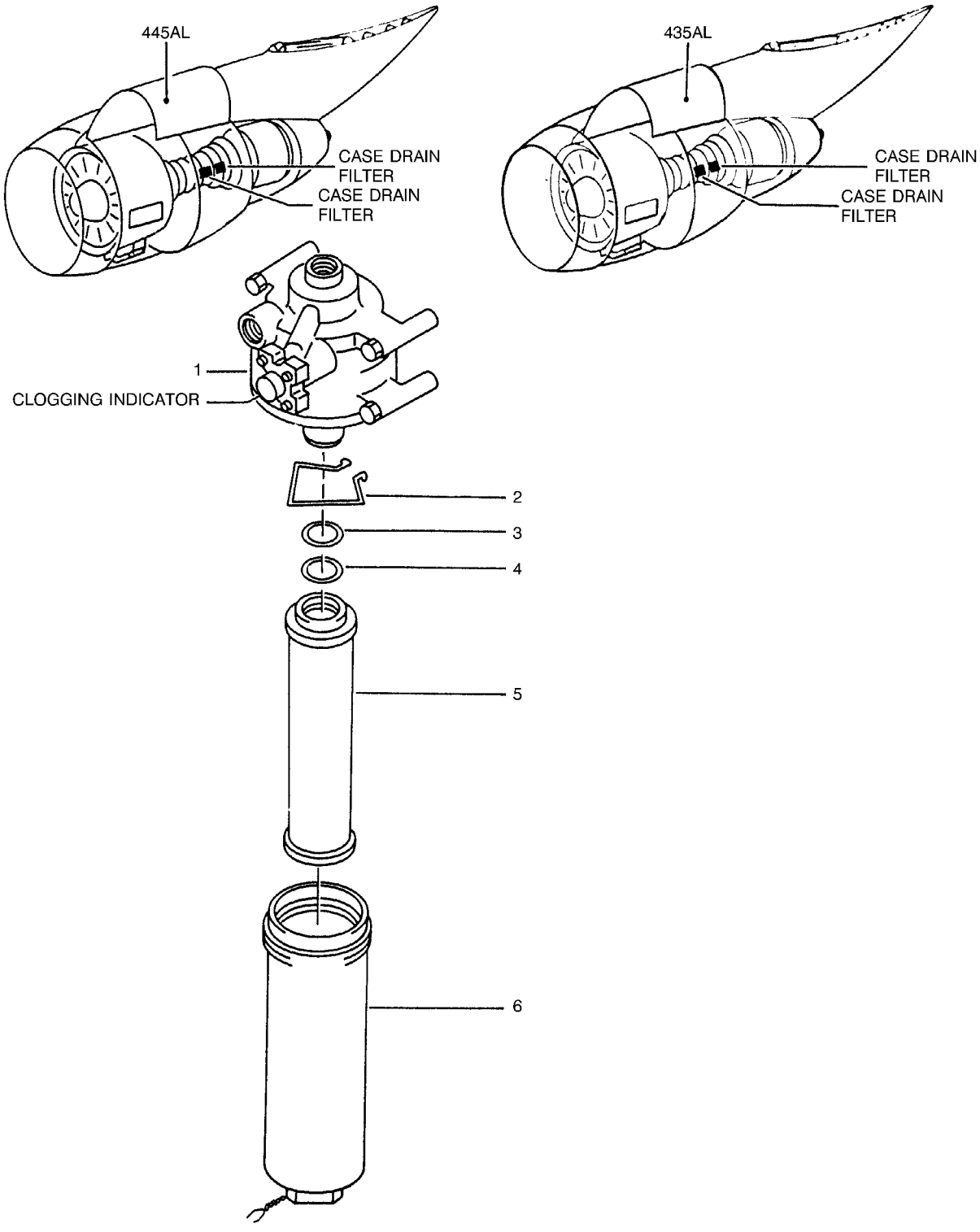
R (Ref. Fig. 902)

**ON A/C ALL

(a)Job set-up
1 Make certain that electronics rack ventilation is correct. Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
2 On panel 20VU, pull ENG1 FIRE and ENG2 FIRE handles and display a warning notice prohibiting opening of fire valves.



Pump Case Drain Filter
Figure 901



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Pump Case Drain Filter
Figure 902

3 On panel 472VU, place ANN LT switch in READ position.
4 On HYD PWR section of panel 471VU, check that the fire valves are closed. SHUT legends of FIRE VALVES annunciators are on.
5 De-energize the aircraft electrical network.
6 Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	ENG1 & 2/START/CTL &/WARN	1KG	335/R68
133VU	ENG1 & 2/IGNITION/SYS A	1JH	334/S72
133VU	ENG1 & 2/IGNITION/SYS B	2JH	333/T52
133VU	ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENG2/REVERSE/CTL	2KM	331/V74

**ON A/C 101-200,

R 7 Open engine cowl door 436AR (446AR) and reverser door 452AR (462AR)
R (Ref. 71-13-00, P. Block 301).

R **ON A/C 001-100,

R 7 Open engine cowl door 435AL (445AL) and reverser door 451AL (461AL)
R (Ref. 71-13-00, P. Block 301).

**ON A/C ALL

(b)Removal
1 Cut and remove lockwire from filter head (1) and bowl (6).
2 Position fluid recovery container under filter.
3 Unscrew bowl (6).
4 Remove clip (2) and retain filter element (5).
5 Remove filter element (5), O-ring (3) and back ring (4) from bowl.
6 Dry out bowl (6) together with packings and clip (2).
(c)Installation
1 Make certain that bowl (6) is clean.
2 Position bowl (6) under filter head (1) and fully tighten bowl.
3 TORQUE bowl (6) to between 2 and 2.7 m.daN (177 and 239 lbf.in.).
4 Wirelock bowl to filter head.
5 Press clogging indicator button if protruding.
(d)Test
1 Filter shall be thoroughly checked for leakage at next engine-driven pump starting.
2 Inspect all other system filters and check that clogging indicators are retracted (Ref. 29-00-00, P. Block 301)
- Green system filters : 291002, 291048, 291049, 291079, 291132.
- Blue system filters : 292002, 292048, 292091.
- Yellow system filters : 293002, 293049, 293090, 293084.
(e)Close-up

**ON A/C 101-200,

R 1 Close engine cowl door 436AR (446AR) and reverser door 452AR (462AR)
R (Ref. 71-13-00, P. Block 301).

R **ON A/C 001-100,

R 1 Close engine cowl door 435AL (445AL) and reverser door 451AL (461AL)
R (Ref. 71-13-00, P. Block 301).

**ON A/C ALL

2 Remove safety clips and tags and close circuit breakers 101GK, 103GK, 1KG, 1JH, 2JH, 1KM and 2KM.
3 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics rack ventilation is correct.
4 On panel 20VU, place ENG1 FIRE and ENG2 FIRE handles in normal position.
5 On HYD PWR section of panel 471VU, check that the fire valves are open. OPEN legends of FIRE VALVES annunciators are on.
6 On panel 472VU, place ANN LT switch in OFF position.
7 Check fluid level in reservoirs and top up if required (Ref. 12-12-29, P. Block 1).
8 Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
9 In flight compartment, on panel 427VU, install a temporary placard to warn the flight crew that ENG1 Green pump case drain filter (ENG2 Green pump, Blue pump, Yellow pump) is deactivated.
10 Make an entry in the aircraft technical log.

B. Reservoir Return Filter (Green 291002-Blue 292002-Yellow 293002)

(1)Equipment and Materials

ITEM	DESIGNATION
(a)	Access Platform, 2.6 in. (8 ft. 8 in.)
Referenced Procedures	
- 29-00-00, P. Block 301	Hydraulic Power
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

(2)Procedure

(Ref. Fig. 903)

(a)Job set-up

1 Open main gear main doors (Ref. 32-12-11, P. Block 301).

2 Position access platform.

(b)Inspection

1 Inspect clogging indicator of Green reservoir return filter 291002 (Blue 292002, Yellow 293002) and if protruding (filter clogged), inspect all other system filter clogging indicators and make certain that they are retracted (Ref. 29-00-00, P. Block 301).
- Green system filters : ENG1 case drain, ENG2 case drain and 291048, 291049, 291079, 291132.
- Blue system filters : case drain and 292091, 292048.
- Yellow system filters : case drain and 293049, 293090, 293084.

(c)Close-up

1 Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

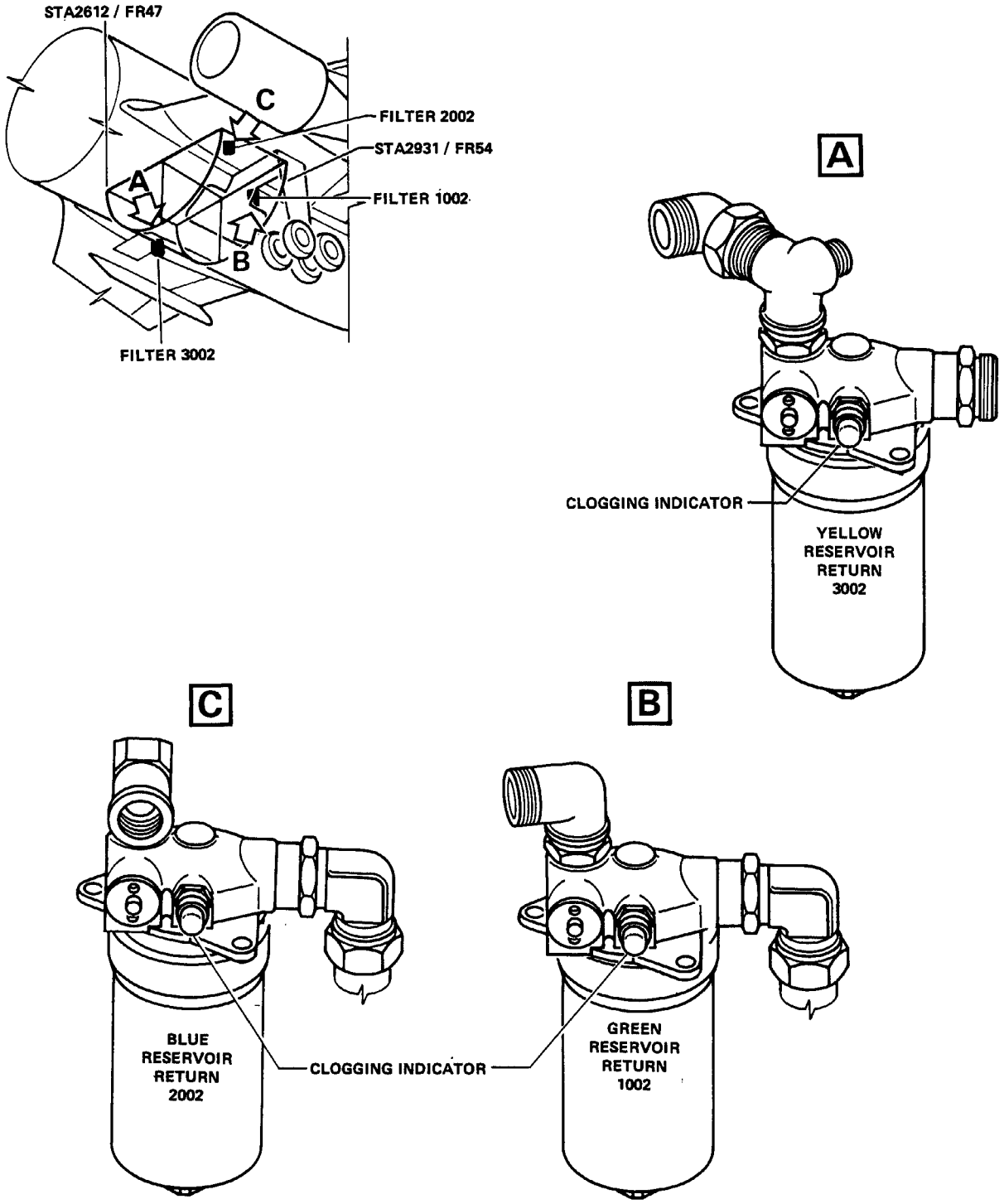
2 Remove access platform.

3 Close main gear main doors (Ref. 32-12-11, P. Block 301).

4 Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

5 In flight compartment, on panel 427VU, install a temporary placard to warn the flight crew that Green reservoir return filter 291002 (Blue 292002, Yellow 293002) is clogged.

6 Make an entry in the aircraft technical log.



Clogging Indicators
Figure 903

C. HP Filter (Green 291048, 291049-Blue 292048-Yellow 293049)

(1)Equipment and Materials

ITEM	DESIGNATION
(a)	Access Platform, 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 29-00-00, P. Block 301	Hydraulic Power
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

(2)Procedure

(Ref. Fig. 904)

(a)Job set-up

1 Open main gear main doors (Ref. 32-12-11, P. Block 301).

2 Position access platform.

(b)Inspection

1 Inspect clogging indicator of Green HP filter 291048 (Green 291049, Blue 292048, Yellow 293049) and if protruding (filter clogged), inspect all other system filter clogging indicators and make certain they are retracted (Ref. 29-00-00, P. Block 301).

- Green system filters : ENG1 case drain, ENG2 case drain and 291002, 291079 and 291048 (or 291049), 1132.
- Blue system filters : case drain and 292002, 292091.
- Yellow system filters : case drain and 293002, 293090, 293084.

(c)Close-up

1 Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

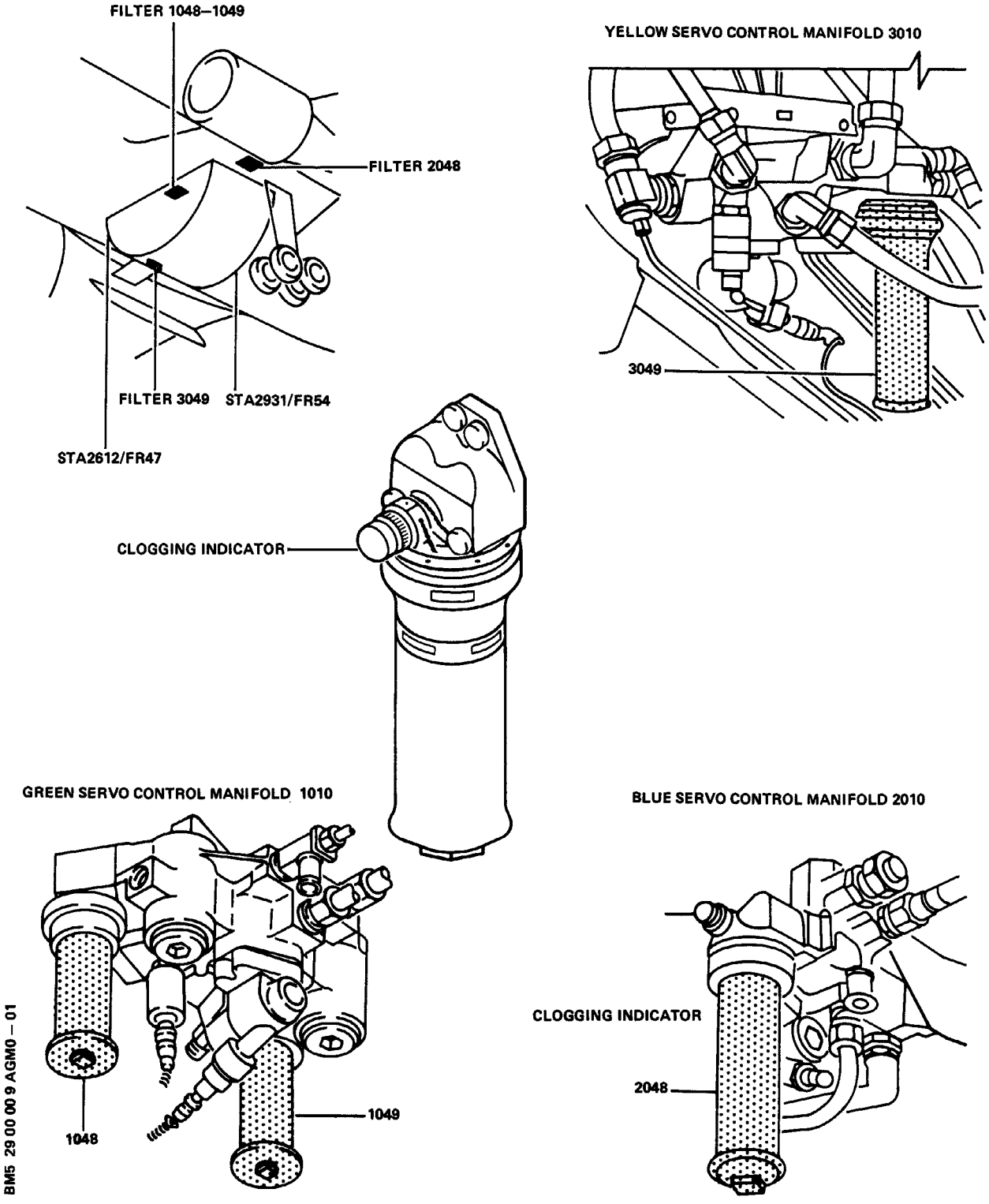
2 Remove access platform.

3 Close main gear main doors (Ref. 32-12-11, P. Block 301).

4 Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

5 In flight compartment, on panel 427VU, install a temporary placard to warn the flight crew that Green HP filter 291048 (291049) (Blue 292048, Yellow 293049) is clogged.

6 Make an entry in the aircraft technical log.



Clogging Indicators
Figure 904

D. HP Filter (Green 291079, 291132; Blue 292091; Yellow 293090, 293084)

(1)Equipment and Materials

ITEM	DESIGNATION
(a)	Access Platform, 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 29-00-00, P. Block 301	Hydraulic Power
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

(2)Procedure

(Ref. Fig. 905)

(a)Job set-up

1 Open main gear main doors (Ref. 32-12-11, P. Block 301).

2 Position access platform.

(b)Inspection

1 Inspect clogging indicator of Green HP filter 291079 (1132) (Blue 292091, Yellow 293090, 293084) and if protruding (filter clogged), inspect all other system filter clogging indicators and make certain they are retracted (Ref. 29-00-00, P. Block 301) :

- Green system filters : ENG1 case drain, ENG2 case drain and 291002, 291048, 291049 and 291079 or 291132.
- Blue system filters : case drain and 292002, 292048.
- Yellow system filters : case drain, 293002, 293049 and 293090 or 293084.

(c)Close-up

1 Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

2 Remove access platform.

3 Close main gear main doors (Ref. 32-12-11, P. Block 301).

4 Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

5 In flight compartment, on panel 427VU, install a temporary placard to warn the flight crew that Green HP filter 291079 (1132) Blue 292091, Yellow 293090, 293084) is clogged.

6 Make an entry in the aircraft technical log.

2. Reactivation

A. Refer to 29-11-36, P. Block 301 : case drain.

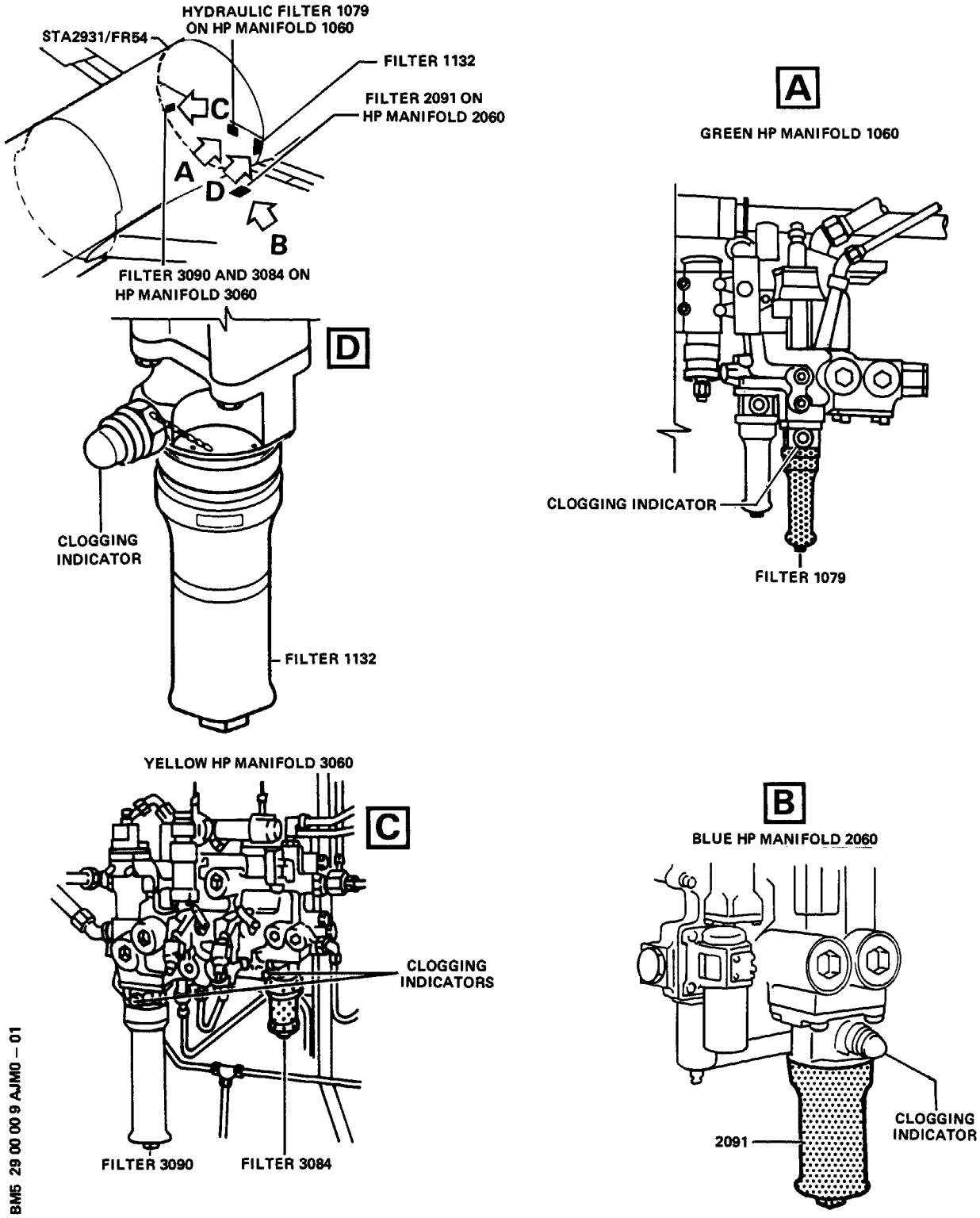
B. Refer to 29-11-42, P. Block 301 : 291048-291049.

R C. Refer to 29-16-11, P. Block 301 : 291132.

D. Refer to 29-11-15, P. Block 301 : 291002.

E. Refer to 29-21-17, P. Block 301 : 291079.

F. Refer to 29-12-15, P. Block 301 : 292002.



Clogging Indicators
Figure 905

R G. Refer to 29-12-52, P. Block 301 : 292048.

H. Refer to 29-22-13, P. Block 301 : 292091-293090.

J. Refer to 29-24-12, P. Block 301 : 293084.

K. Refer to 29-13-15, P. Block 301 : 293002.

L. Refer to 29-13-54, P. Block 301 : 293049.

HYDRAULIC SYSTEM ACCUMULATORS (GREEN 291070 - BLUE 292070 - YELLOW 293070) - DEACTIVATION/REACTIVATION

Ref. MMEL Section 1-29, Item 6 : (Hydraulic system accumulators)

CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MMEL.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Hydraulic System Accumulator Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breakers Safety Clips
(2)	Containers
(3)	Blanking Plugs/Caps
(4)	Warning Notices
(5)	Access Platform, 2.6m (8ft. 8in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-11-56, P. Block 401	Accumulator
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

(1)Job Set-Up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)On panel 427VU :

- display a warning notice prohibiting operation of Green, Blue and Yellow systems.

(c)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN/	4GE	331/V60

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(d)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(e)Position access platform.
(f)Open access doors to hydraulic ground connectors and display warning notice to prohibit hydraulic system pressurization :
- for Green system : 147AL
- for Blue system : 571DB
- for Yellow system : 671DB.

(g)Depressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301) and prohibit its pressurization by displaying a warning notice :
- on panel 429VU, to prohibit APU starting
- on hydraulic reservoir pressurization connector.

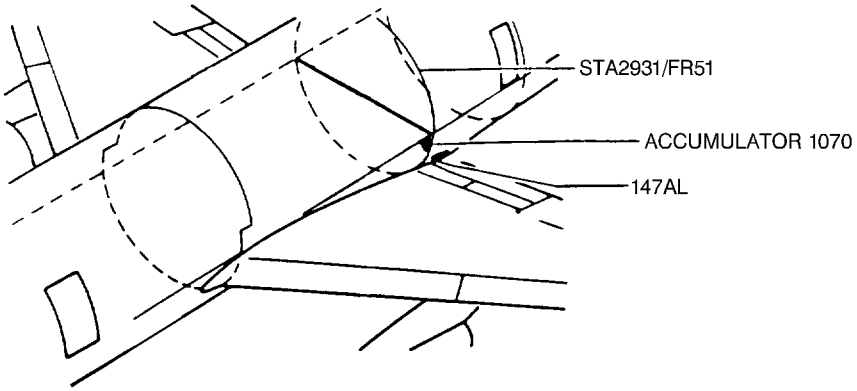
(h)Depressurize related hydraulic system using manual decompression push-button located on pressure manifold (Ref. 29-10-00, P. Block 301) :
- for Green system, pushbutton 1063 located on pressure manifold 1060
- for Blue system, pushbutton 2063 located on pressure manifold 2060
- for Yellow system, pushbutton 3063 located on pressure manifold 3060.

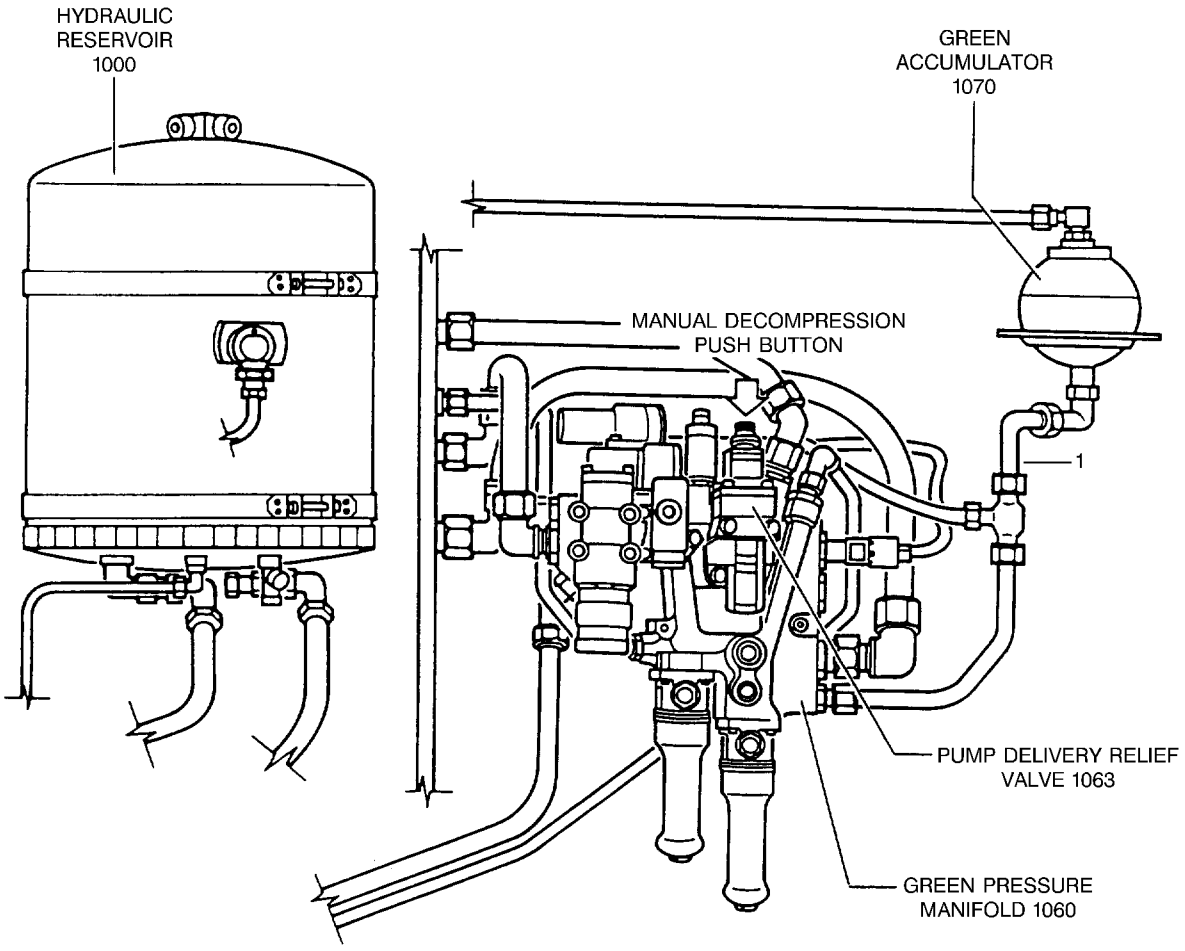
(j)Position hydraulic fluid container under faulty accumulator.
(k)Release accumulator nitrogen pressure by operating related valve :
- for Green system, valve 1071 located on manifold 1069
- for Blue system, valve 2071 located on manifold 2069
- for Yellow system, valve 3071 located on Yellow accumulator.

Proceed as follows :
1 Remove cap from valve.
2 Loosen locknut.
3 Release pressure by operating valve.
4 Make certain that pressure read on pressure gage is zero.

(2)Deactivation of Green, Blue and Yellow Accumulators
(Ref. Fig. 906, 907, 908)
(a)Disconnect pipe (1) between accumulator and pressure manifold.
(b)Remove pipe (1) and install blanking plugs on accumulator and on pressure manifold.
(c)Install blanking plug on pipe (1).
(d)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 1GL, 6GL and 7GX.
(e)Pressurize hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(f)Check hydraulic fluid level in reservoirs, top up if necessary (Ref. 12-12-29, P. Block 1).
(g)Pressurize hydraulic system (Ref. 29-10-00, P. Block 301) and make certain that there are no leaks.

(4)Close-Up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove hydraulic fluid container.
(c)Remove access platform.

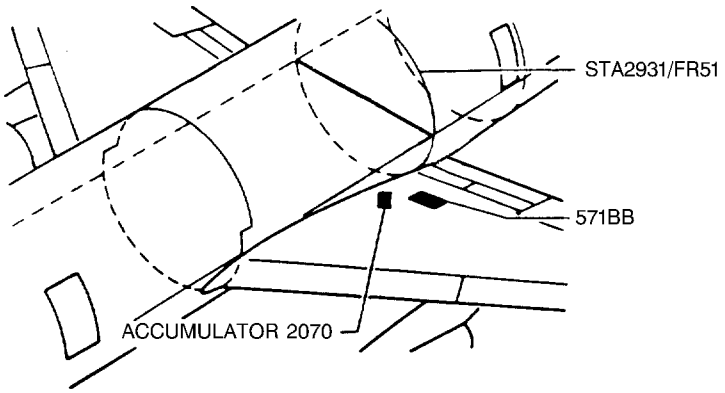


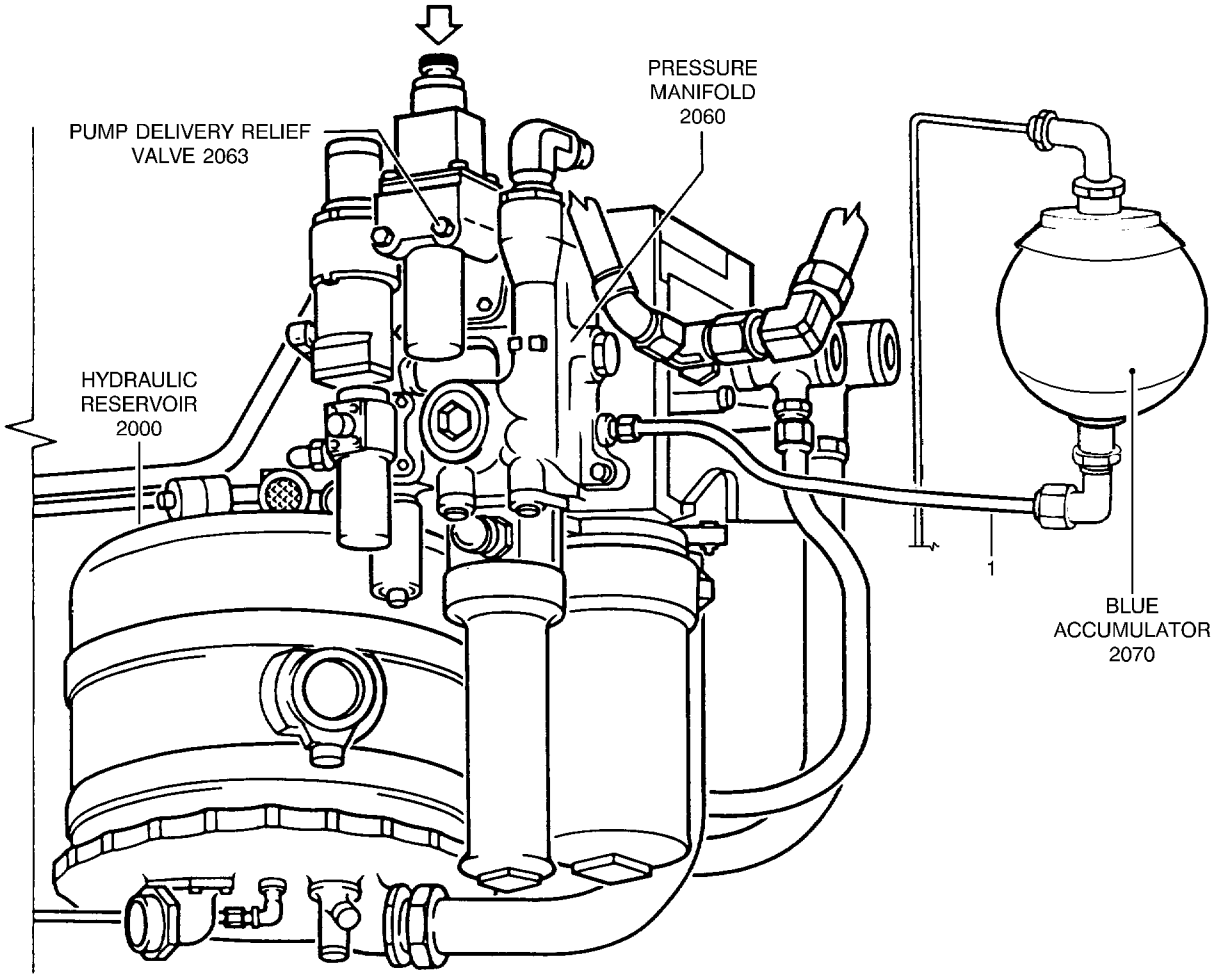


BM5 29 00 00 9 AAN0 02

Green System Accumulator
Figure 906

R

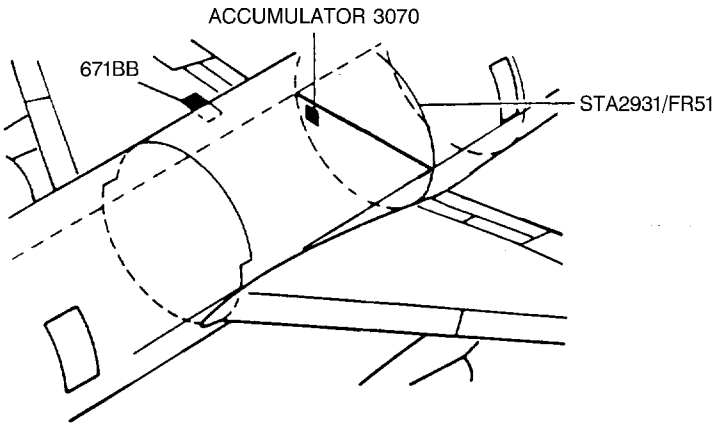


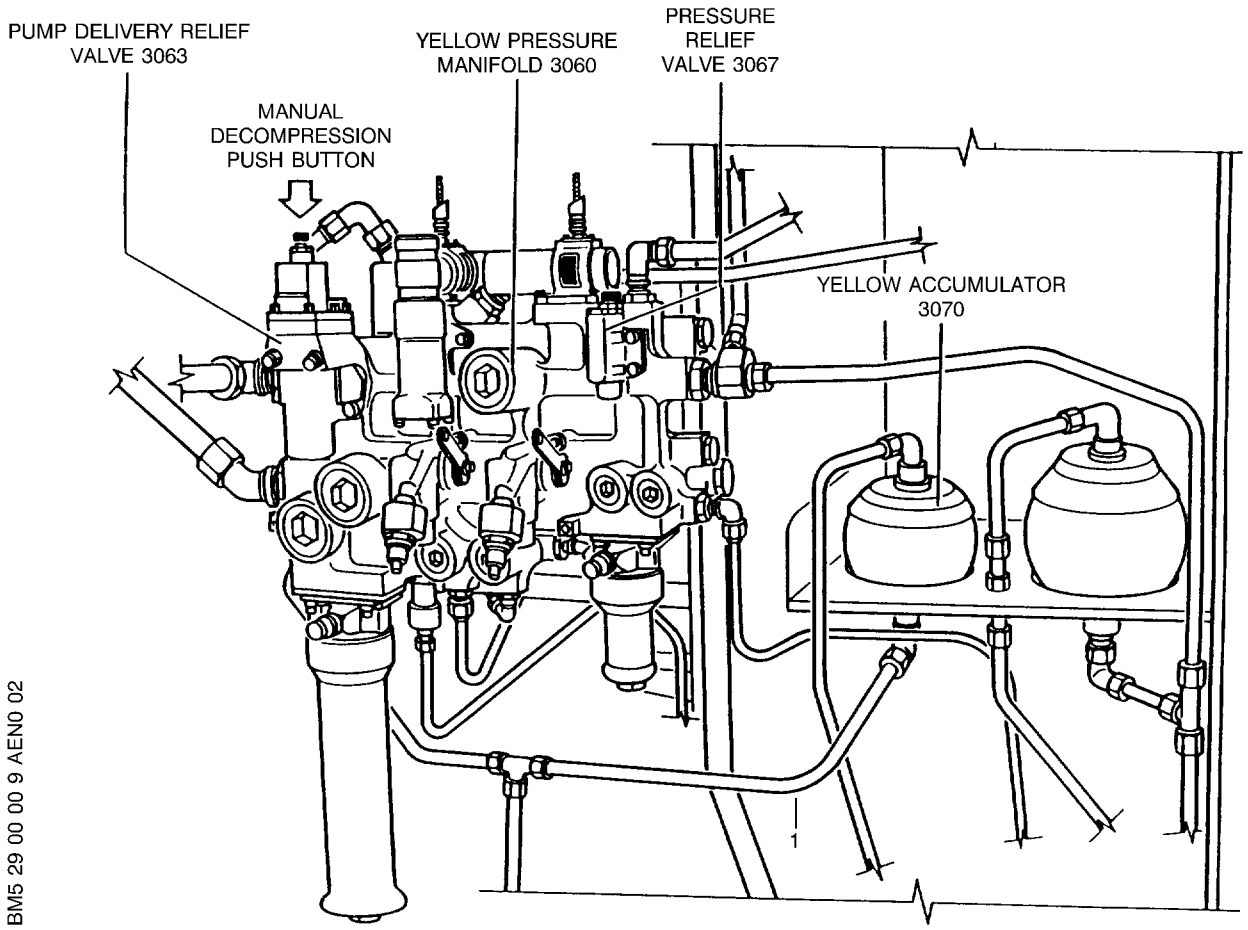


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Blue System Accumulator
Figure 907

R





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Yellow System Accumulator
Figure 908

R

(d)Close main landing gear door (Ref. 32-12-11, P. Block 301).
(e)Remove warning notices and close access door to hydraulic ground connectors.
(f)Make an entry in the aircraft technical log.

2. Hydraulic System Accumulator Reactivation

A. For Green, Blue and Yellow accumulators (Ref. 29-11-56, P. Block 401).
NOTE : To connect the new accumulator, use the pipe removed during deactivation.

1. General

(Ref. Fig. 001)
(Ref. Fig. 002)

Each main system includes :

- A reservoir from which fluid is drawn by...
- One (or two) engine pump(s), which pressurizes...
- The four pumps are mounted on the engine accessory gearboxes. On the two engines, the pump on the left is always the Green pump. The pump on the right is either the Blue pump or the Yellow pump (Ref. Fig. 002).
- A servo controls manifold, then...
- An HP manifold, which directs pressure to the other user systems.
- Valves (check valves, shutoff valves, selector valves etc...) govern the possibility, direction or priority or fluid flow.
- Filters, with a maximum filtering capability of 3 to 15 μ maintain cleanliness of the fluid between...
- The return manifold and the reservoir.

Each of these components in turn are described in the following section, relative to the Green system, but are depicted on the diagram specific to each system :

- Green Main Hydraulic Power .....29-11 (Ref. Fig. 001)
- Blue Main Hydraulic Power .....29-12 (Ref. Fig. 001)
- Yellow Main Hydraulic Power .....29-13 (Ref. Fig. 001)

These figures also depict :

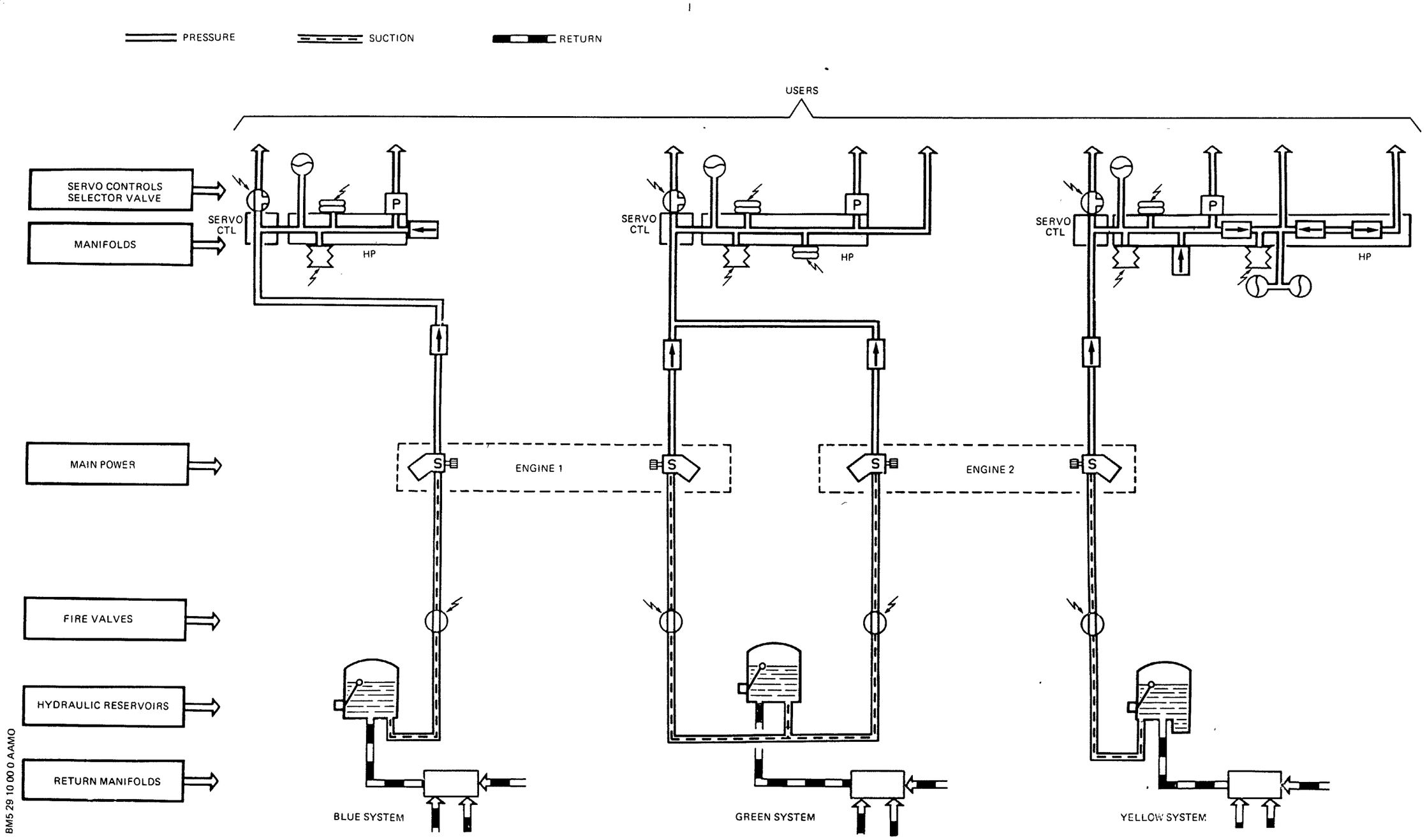
- Auxiliary power facilities 29-20

These figures also depict :

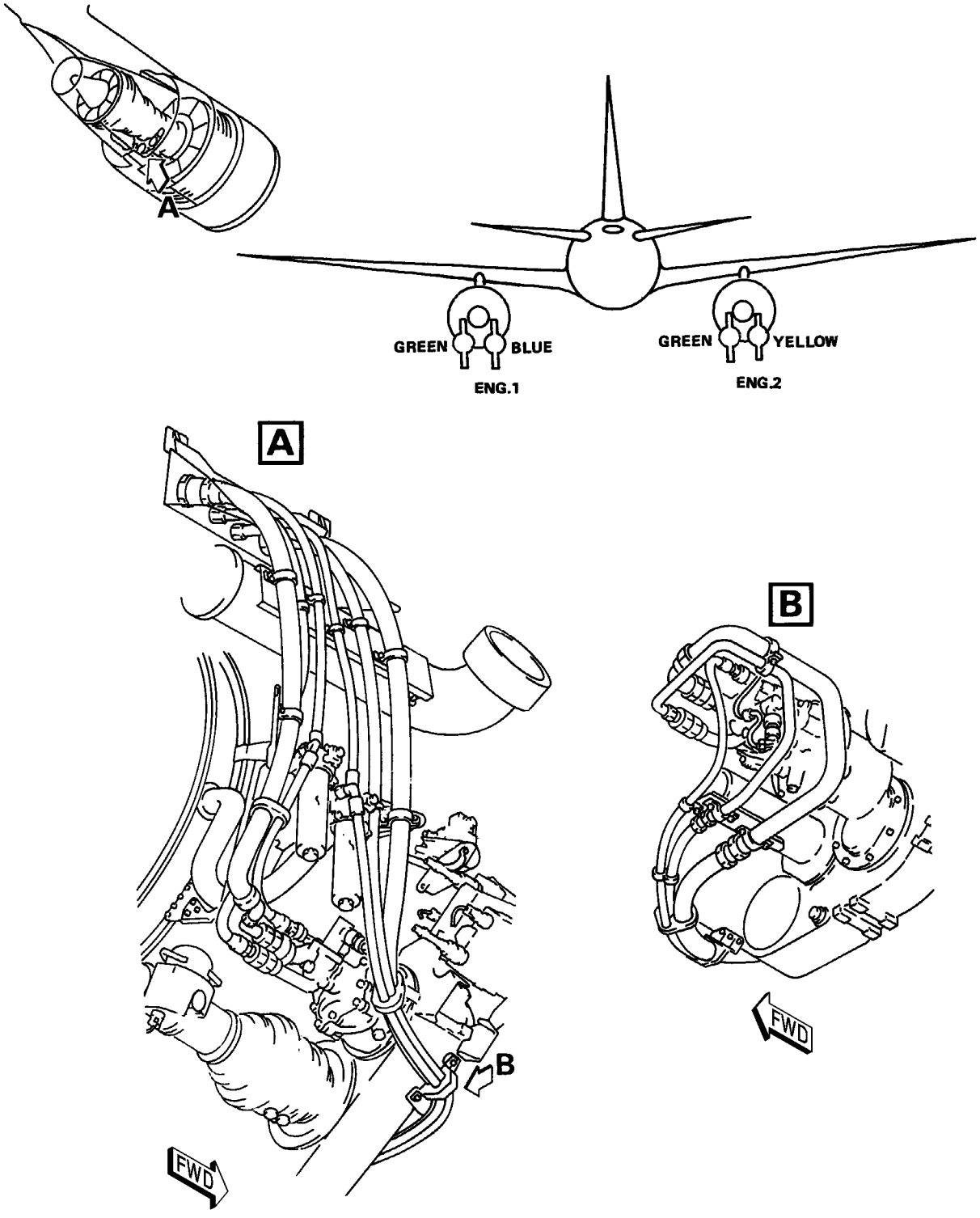
- Auxiliary power facilities 29-20
- Details of the user systems ...ATA 24, 27, 32 and 52
- Reservoir Pressurizing System .....29-14 (Ref. Fig. 001)
- Reservoir Filling .....29-16 (Ref. Fig. 001)
- On the ground, hydraulic power is supplied through ground connectors. Fluid is drawn directly from the reservoir and is delivered upstream of the servo controls manifold. (Ref. Fig. 002)

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Main Power
Figure 001



BM5 29 10 00 0 AFM0 01

Engine Pumps Location (PW 4000)
Figure 002

R

1. General

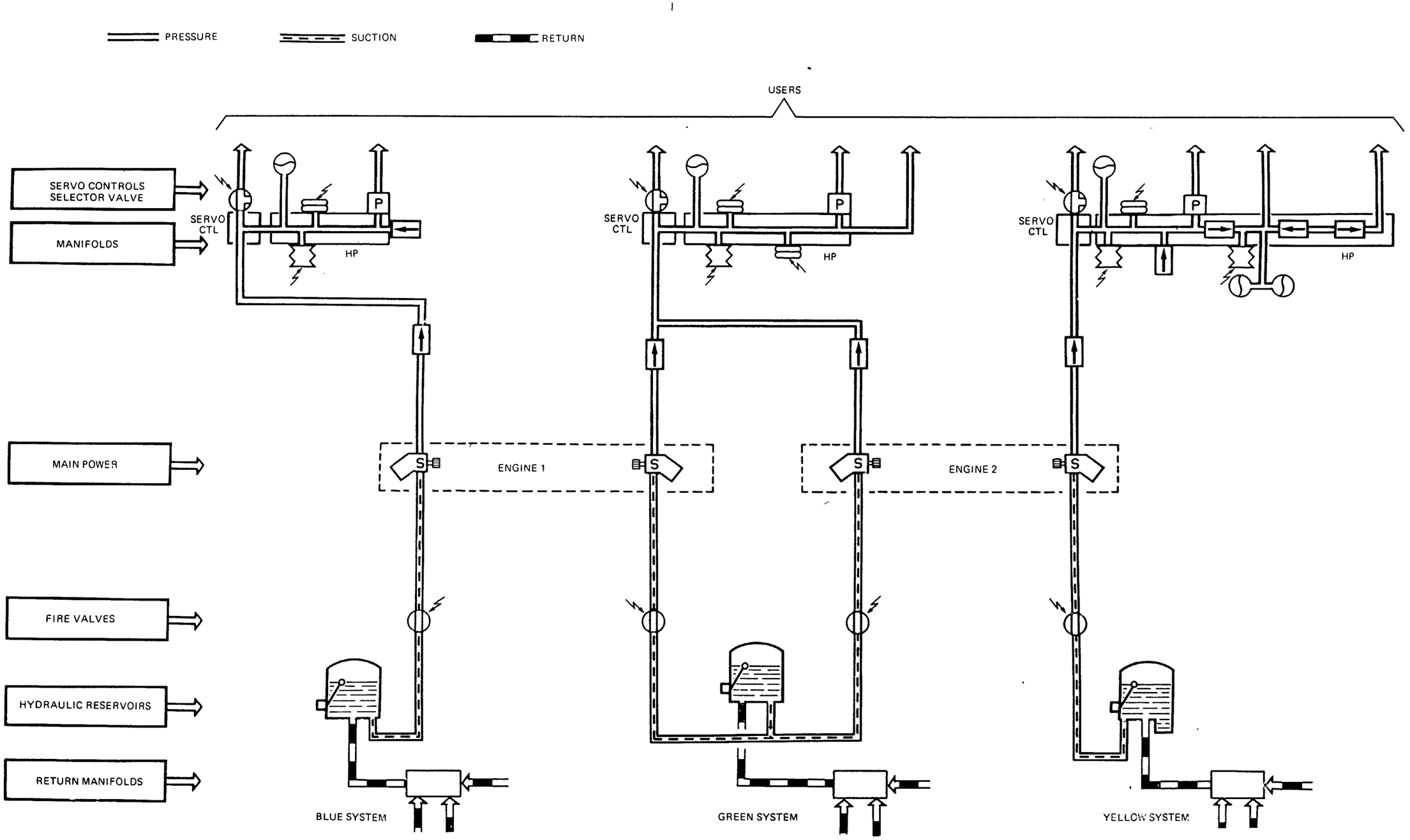
(Ref. Fig. 001)
(Ref. Fig. 002)
Each main system includes :
- A reservoir from which fluid is drawn by...
- One (or two) engine pump(s), which pressurizes...
- The four pumps are mounted on the engine accessory gearboxes. The upper pump is always the green pump. On the left engine, the lower pump is the Blue pump; on the right engine it is the Yellow pump (Ref. Fig. 002).
- A servo controls manifold, then...
- An HP manifold, which directs pressure to the other user systems.
- Valves (check valves, shutoff valves, selector valves etc...) govern the possibility, direction or priority or fluid flow.
- Filters, with a maximum filtering capability of 3 to 15 μ maintain cleanliness of the fluid between...
- The return manifold and the reservoir.

Each of these components in turn are described in the following section, relative to the Green system, but are depicted on the diagram specific to each system :
- Green Main Hydraulic Power .....29-11 (Ref. Fig. 001)
- Blue Main Hydraulic Power .....29-12 (Ref. Fig. 001)
- Yellow Main Hydraulic Power .....29-13 (Ref. Fig. 001)

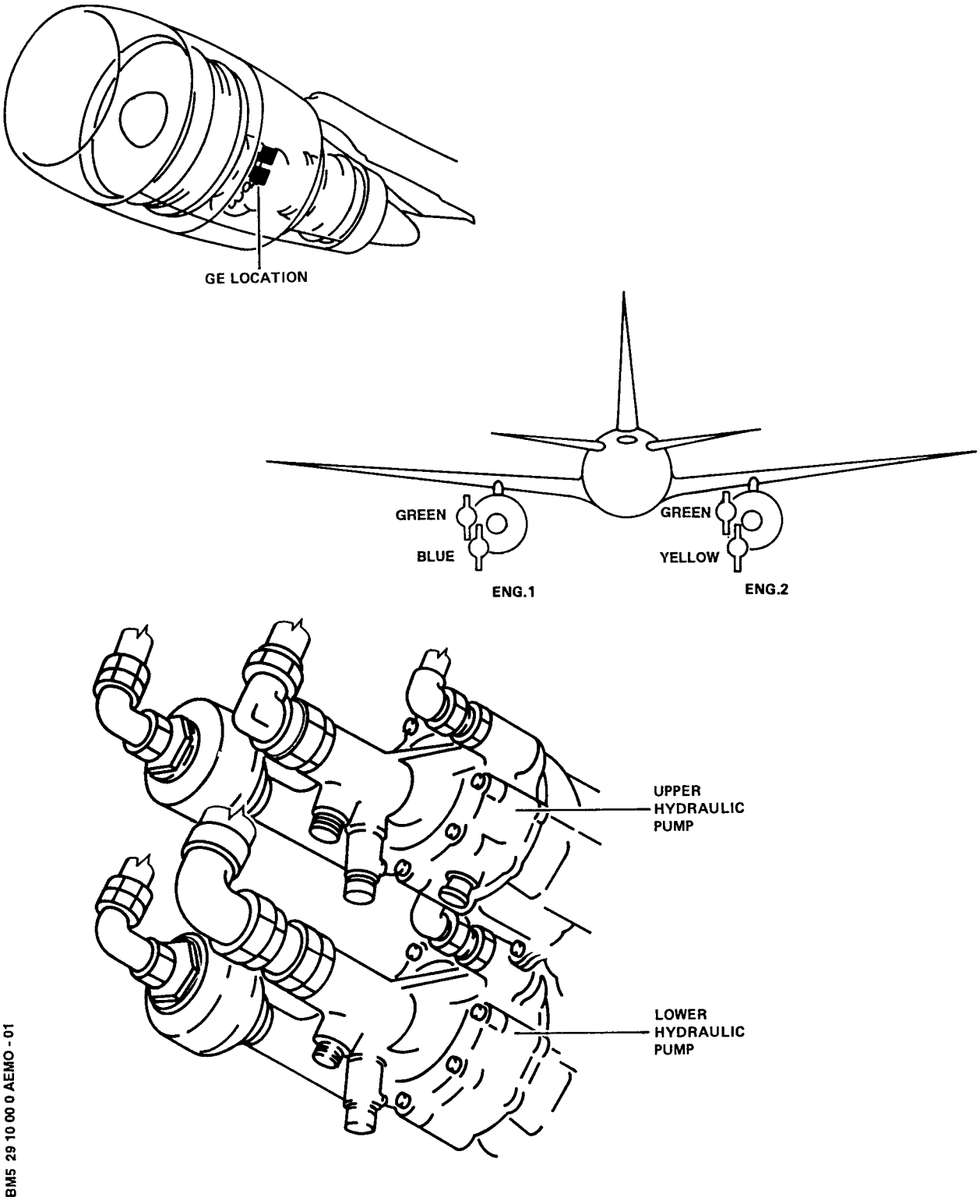
These figures also depict :
- Auxiliary power facilities 29-20
- Auxiliary power facilities 29-20
- Details of the user systems ...ATA 24, 27, 32 and 52
- Reservoir Pressurizing System .....29-14 (Ref. Fig. 001)
- Reservoir Filling .....29-16 (Ref. Fig. 001)
  is drawn directly from the reservoir and is delivered upstream of the servo controls manifold.
- On the ground, hydraulic power is supplied through ground connectors. Fluid is drawn directly from the reservoir and is delivered upstream of the servo controls manifold. (Ref. Fig. 002)

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Main Power
Figure 001



Engine Pumps Location (GE 80C)
Figure 002

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Depressurization of Green, Blue and Yellow Hydraulic Systems

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

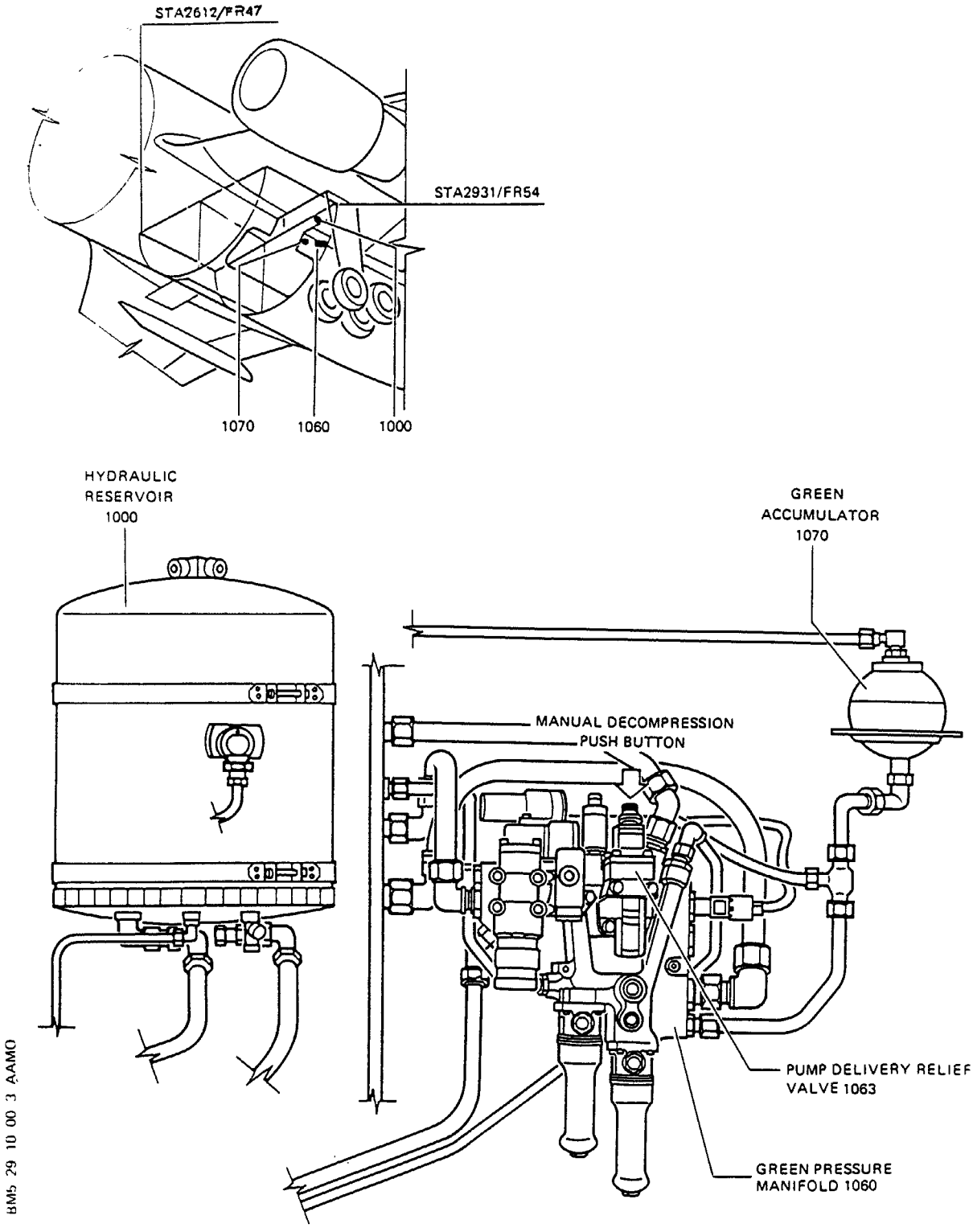
R CAUTION : DO NOT START OR DRY MOTOR THE ENGINE(S) WITH :
R - A STANDARD HYDRAULIC GROUND POWER SUPPLY OR
R - THE PORTABLE HYDRAULIC GROUND POWER UNIT CONNECTED TO THE
R AIRCRAFT.
R IF YOU DO, YOU CAN CAUSE DAMAGE TO THE ENGINE PUMPS.

A. Reason for the Job.
Depressurization of hydraulic system.

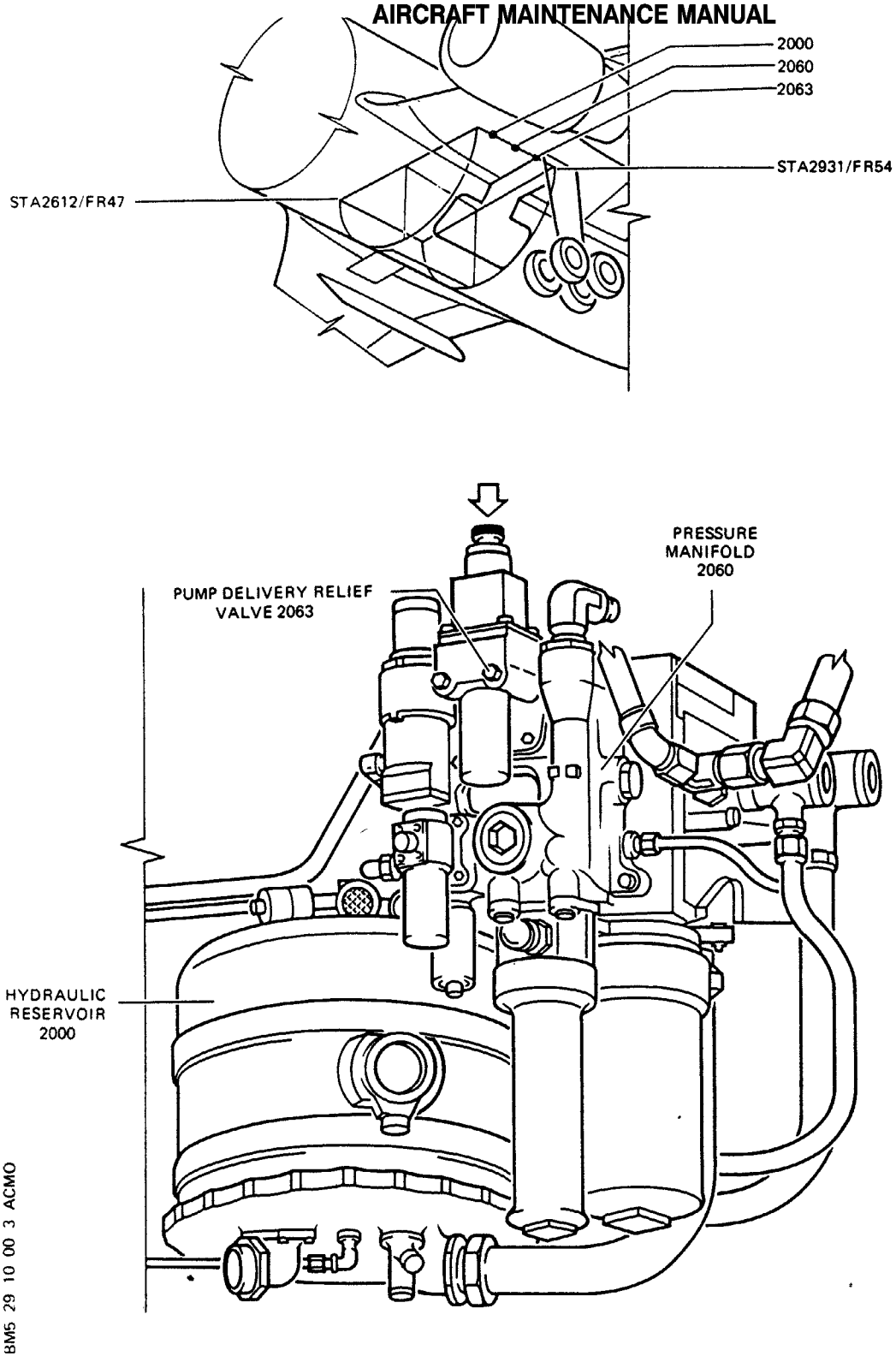
B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.60 m (8 ft. 8 in.)
Referenced Procedures	
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

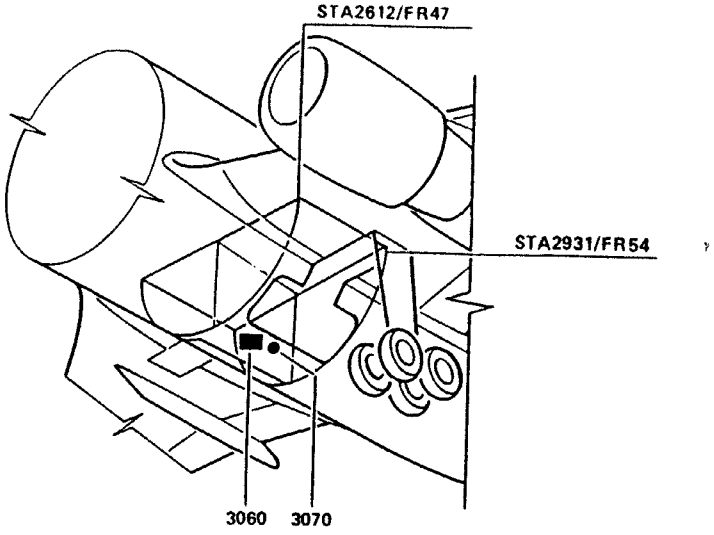
C. Procedure
(Ref. Fig. 301, 302, 303)
(1)Job Set-up
(a)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(2)Depressurization of hydraulic systems
(a)Press manual decompression pushbutton on pump delivery/pressure relief valve :
291063 for Green hydraulic system
292063 for Blue hydraulic system
293063 for Yellow hydraulic system.
293067 for Braking system.
installed on pressure manifolds 291060, 292060 and 293060 respectively.
(b)Aurally check for pressure drop in systems. Green, Blue and Yellow

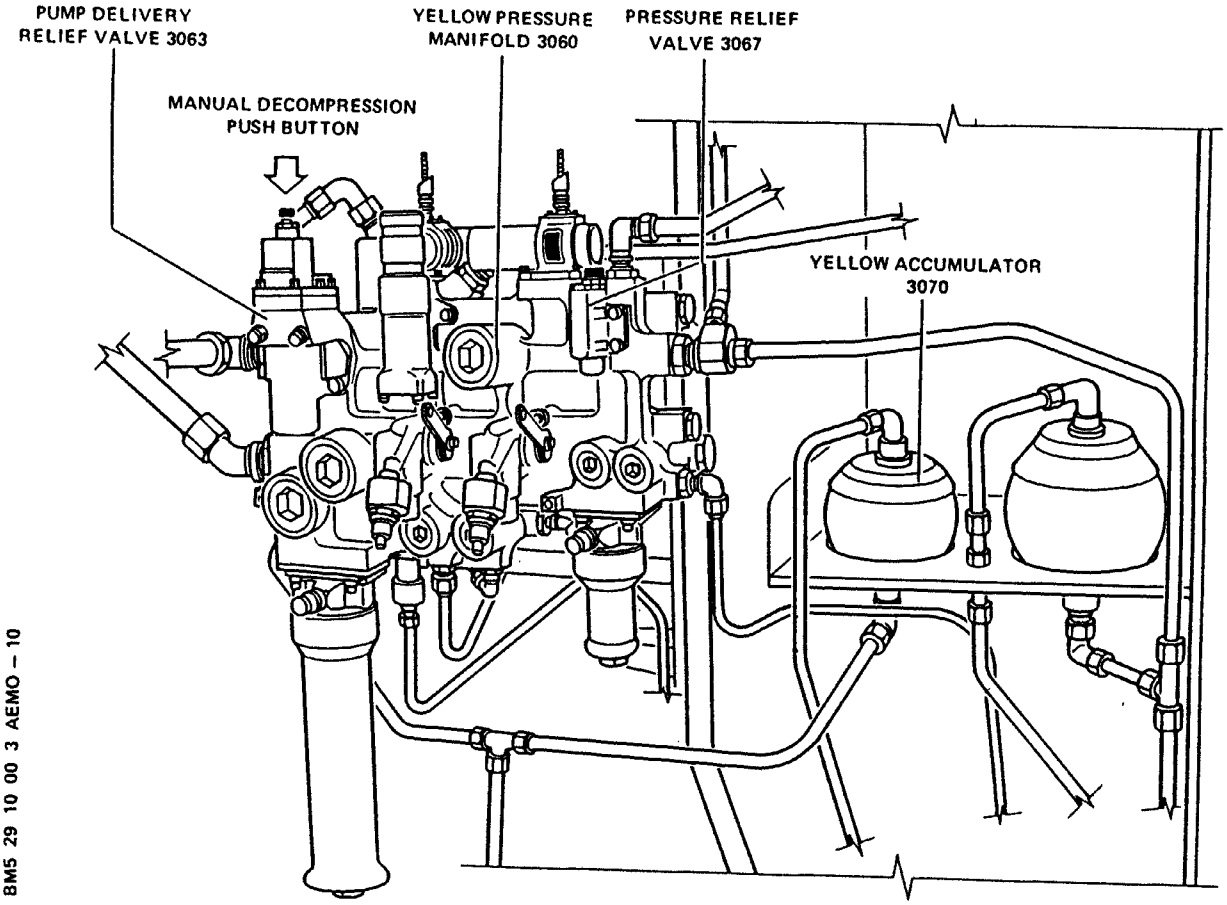


Depressurization of Green Hydraulic System
Figure 301



Depressurization of Blue Hydraulic System
Figure 302





Depressurization of Yellow Hydraulic System
Figure 303

system accumulator direct reading pressure gage must display 1450 psi (100 bars) approx.

(c)Depressurize hydraulic system reservoirs (Ref. 29-14-00, P. Block 301).

2. Pressurization of Green, Blue and Yellow Hydraulic Systems

CAUTION : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING THE HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
PRIOR TO USING HYDRAULIC GROUND POWER CARTS, CHECK THAT HYDRAULIC FLUID CONTAINED IN THEM IS COMPATIBLE WITH FLUID IN AIRCRAFT SYSTEMS.

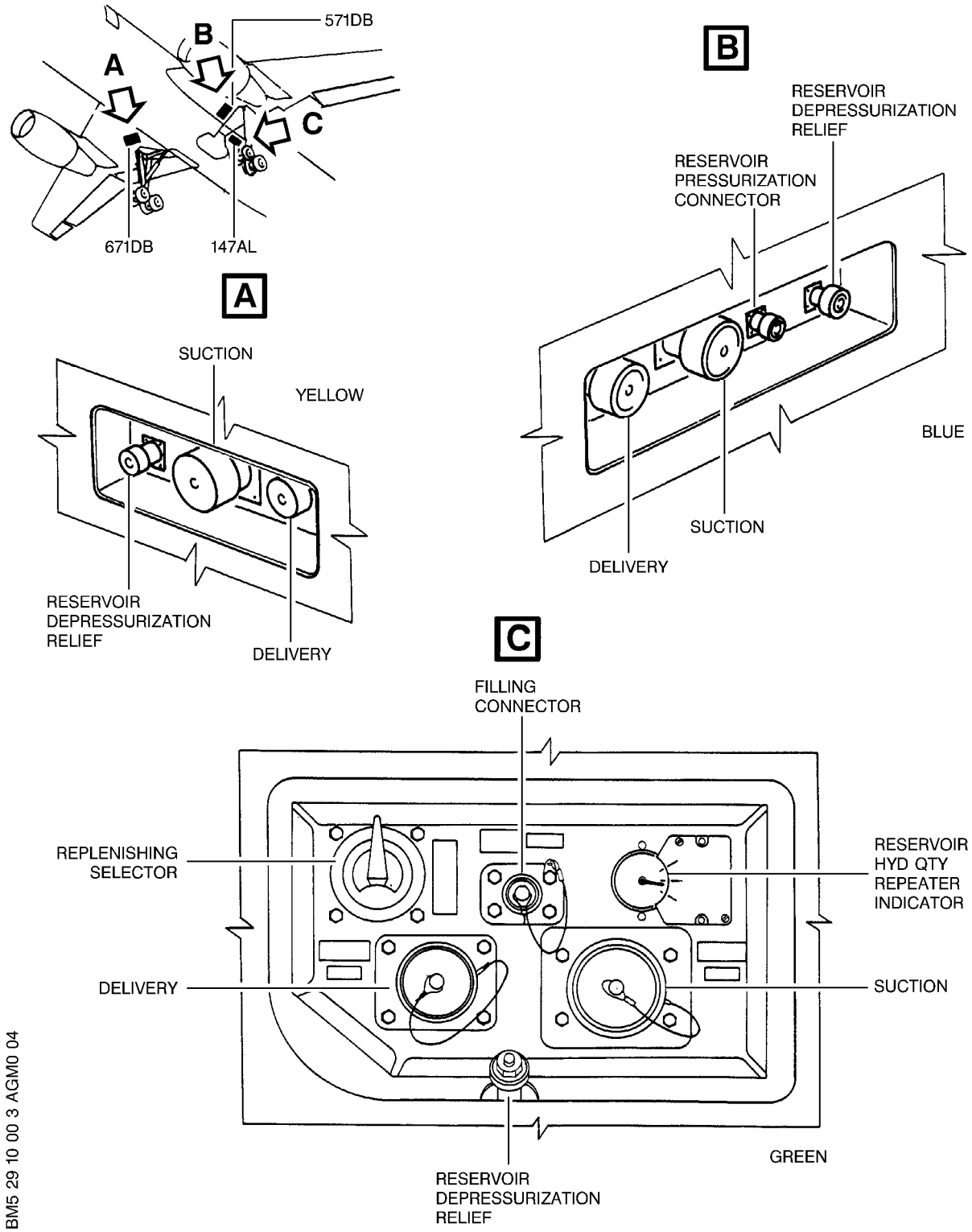
R CAUTION : DO NOT START OR DRY MOTOR THE ENGINE(S) WITH :
R - A STANDARD HYDRAULIC GROUND POWER SUPPLY OR
R - THE PORTABLE HYDRAULIC GROUND POWER UNIT CONNECTED TO THE AIRCRAFT.
R IF YOU DO, YOU CAN CAUSE DAMAGE TO THE ENGINE PUMPS.

A. Reason for the Job
Pressurization of hydraulic systems

B. Equipment and Materials

ITEM	DESIGNATION
(1)EMH1569S	Cart - Hydraulic Ground Power Supply 150 l/min (39.6 US GPM)
or	
EMH1569N	Cart - Hydraulic Ground Power Supply 150 l/min (39.6 US GPM)
or	
EMH1569RQV	Cart - Hydraulic Ground Power Supply 150 l/min (39.6 US GPM)
(2)	Access Platform 2.60 m (8 ft. 8 in.)
(3)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(Ref. Fig. 304)
(1)Job set-up
(a)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(b)Make certain that reservoir air pressure gage 1383 reads 3.5 bars (50 psi). Pressurize, if required.
(c)Check hydraulic fluid level in reservoir, top up, if required (Ref. 12-12-29, P. Block 1).
(d)Open, safety and tag the following circuit breakers.



Green, Blue and Yellow Hydraulic System Ground Connectors
Figure 304

R

PANEL	SERVICE	IDENT.	LOCATION
22VU	LDG/GEAR/EXTEND/CTL	1GA	201/J28
133VU	L/G PROX DET/& RELAYS SYS 1/RELAYS/ & RETRACT/CTL	2GB	332/U51
133VU	ELEC/PUMP/WARN/	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60

(e)On center instrument panel 4VU, make certain that landing gear control lever is in DOWN position. Display a warning notice prohibiting its operation.
(f)Between first officer's and 3rd occupant's seats, make certain that landing gear Free Fall extension control handle is in Normal position. Display a warning notice prohibiting its operation.
(g)Check that the following circuit breakers are closed

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58

(h)Open access doors :
147AL to Green hydraulic system ground connectors.
R 571DB to Blue hydraulic system ground connectors.
R 671DB to Yellow hydraulic system ground connectors.
(j)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2)Pressurization of hydraulic systems.
(a)Connect suction and delivery lines of hydraulic ground power cart to ground connectors :
291006 and 291008 for Green hydraulic system
292006 and 292008 for Blue hydraulic system
293006 and 293008 for Yellow hydraulic system.
(b)Pressurize Green, Blue and Yellow hydraulic systems to 3000 PSI (206 bars) by operating hydraulic ground power cart controls.
(c)On ECAM control panel, press HYD pushbutton switch, HYD page appears on right display unit. Check that GREEN, BLUE and YELLOW system pages read :
- 2800 to 3300 psi (192 to 226,6 bars) (For A/C fitted with pressure transducer P/N 64250-005-02 Amend A).
NOTE : When PTU is in use 3500 psi (240 bars) may be reached.
- 3000 ± 200 psi (206 ± 13.5 bars) (For A/C fitted with pressure transducer P/N 64250-005-02 Amend B).
(d)Check that direct reading pressure gages 291072, 292072, 293072 and 293128 installed respectively on Green, Blue and Yellow system accumulators 291070, 292070 and 293070 read 3000 ±100 PSI (206 ±7 bars).
(3)Close-up
(a)Operate hydraulic ground power cart controls to shut down pressurization of hydraulic systems.

(b)Remove safety clips and tags and close circuit breakers :1GA, 2GB, 4GE, 1GL and 6GL.
(c)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(d)Disconnect hydraulic ground power cart.
(e)Close ground connector access doors.
(f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(g)Remove all ground handling and maintenance equipment, standard and special tools together with ground power and replenishing equipment, all access equipment and miscellanous items.

WARNING : BEFORE PROCEEDING WITH ADJUSTMENT/TEST WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Fire Valves

A. Operational Test
(1)Reason for the job
(a)Test of fire shut off valve annunciator lights.
(b)Operational test of Green, Blue and Yellow system fire valves 110GK, 111GK, 9GJ and 2GD and associated indicating system.
(2)Equipment and materials

ITEM	DESIGNATION
R A.	Snapwire, 0.3 or 0.4 mm (0.012 or 0.015 in.) dia. with breaking strength 2.0 to 3.5 daN (4.5 to 7.9 lbf)
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

(3)Procedure
(a)Job set-up
1 On overhead panel 20VU, make certain that ENG 1 FIRE and ENG 2 FIRE handles are in normal configuration (pushed in).
2 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
3 Make certain that the following circuit breakers are closed :

**ON A/C 001-100,

Post SB 29-2082 For A/C 001-100,

MAIN HYDRAULIC POWER - ADJUSTMENT/TEST
WARNING : BEFORE PROCEEDING WITH ADJUSTMENT/TEST WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL

CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Fire Valves

A. Operational Test
(1)Not applicable

R **ON A/C ALL

PANEL	SERVICE	IDENT.	LOCATION
133VU	FIRE VALVES/ENG 1	101GK	334/S57
133VU	FIRE VALVES/ENG 2	103GK	334/S58
132VU	INTERIOR LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	MAINT PANEL/ANN & MFA	22WB	324/L79

4 Open, safety and tag the following circuit breakers :
NOTE : Open those circuit breakers only for performing operational test of fire shut off valves.

PANEL	SERVICE	IDENT.	LOCATION
22VU	ENG 1 AND 2 SQUIB B BTL1	5WE	207/C19
22VU	ENG 1 AND 2 SQUIB B BTL2	7WE	207/C20
133VU	ENG 1 AND 2 FIRE EXTING SQUIB A BTL 1	1WE	335/R71
133VU	ENG 1 AND 2 FIRE EXTING SQUIB A BTL 2	3WE	335/R72

(b)Test
1 Test of fire shut off valve annunciator lights.

ACTION	RESULT
1. In flight compartment, on maintenance panel 472VU,	On HYD PWR section of panel 471VU
A. Place ANN LT switch in READ position.	OPEN legends of the four FIRE VALVES annunciators come on.
NOTE : Some memorized fault annunciators may also come on, indicating faulty status of the involved system. Record all MFAs on because they will be reset when MFA RESET pushbutton switch is pressed.	
B. Place ANN LT switch in TEST position.	OPEN and SHUT legends of the four FIRE VALVES annunciators are on.
C. Place ANN LT switch in READ position.	OPEN legends of the four FIRE VALVES annunciators remain on.
NOTE : On panel 470VU (471VU) (472VU), press MFA RESET pushbutton switch to reset all memorized fault annunciators.	
D. Place ANN LT switch in OFF position.	Legends of above mentioned annunciators go off.

2 Operational test of Green, Blue and Yellow system fire valves 110GK, 111GK, 9GJ and 2GD and associated indicating system.
NOTE : Information between parentheses concerns equipment relevant to

engine 2.

CAUTION : FIRE VALVE MOTORS MUST NOT OPERATE CONTINUOUSLY FOR MORE THAN 30 SECONDS. ALLOW FIRE VALVE MOTORS TO COOL AFTER SIX SUCCESSIVE SEQUENCES.

ACTION	RESULT
1. In flight compartment, on maintenance panel 472VU, place ANN LT switch in READ position.	On panel 471VU, OPEN legends of the four FIRE VALVES annunciators come on.
2. On overhead panel, pull ENG 1(2) FIRE handle. - Measure valves closing time, between extinguishing of OPEN legends and illumination of SHUT legends ; this time must not exceed 5 seconds.	Green and Blue (Green and Yellow) system fire valves close. During valve motor operation, OPEN legends of FIRE VALVES/B and G ENG 1 (G and Y ENG 2) annunciators go off. SHUT legends remain off. At end of operation, SHUT legends come on and OPEN legends remain off.
3. Place ENG 1 FIRE (ENG 2 FIRE) handle in the pushed position. - Measure valves opening time, between extinguishing of SHUT legends and illumination of OPEN legends ; this time must not exceed 5 seconds.	Green and Blue (Green and Yellow) system fire valves open. During valve motor operation, SHUT legends of FIRE VALVES/B and G ENG 1 (G and Y ENG 2) annunciators go off. OPEN legends remain off. At end of operation, OPEN legends come on. SHUT legends remain off.
4. On panel 472VU, place ANN LT switch in OFF position.	OPEN and SHUT legends of the four FIRE VALVES annunciators are off.

(4)Close-up
(a)In avionics compartment shelf 81VU, on GPCU, press MEMORY CLEAR push-button switch.
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Replace snapwire on ENG 1 and ENG 2 FIRE handles.
(d)Remove safety clips and tags close circuit breakers : 1WE, 3WE, 5WE and 7WE.

B. Functional Test of Fire Valves and Associated Indicating System

(1)Reason for the job

(a)Functional test of Green, Blue and Yellow system fire valves 110GK, 111GK, 9GJ and 2GD and of associated indicating system.

NOTE : The present functional test calls for an engine Run.

(2)Equipment and materials

ITEM	DESIGNATION
(1)	Snapwire
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 71-00-00, P. Block 501	Power Plant

(3)Procedure

(a)Job set-up

1 In flight compartment, make certain aircraft is in the following configuration :
on overhead panel 20VU : ENG 1 FIRE and ENG 2 FIRE handles pushed.

2 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

3 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FIRE VALVES/ENG 1	101GK	334/S57
133VU	FIRE VALVES/ENG 2	103GK	334/S58
132VU	INTERIOR LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	MAINT PANEL/ANN & MFA	22WB	324/L79

(b)Test

NOTE : Information between parentheses concerns equipment relevant to engine 2.

CAUTION : FIRE VALVE MOTORS MUST NOT OPERATE CONTINUOUSLY FOR MORE THAN 30 SECONDS. ALLOW FIRE VALVE MOTORS TO COOL AFTER SIX SUCCESSIVE SEQUENCES.

ACTION	RESULT
1. In flight compartment, on maintenance panel 472VU, place ANN LT switch in READ position.	On panel 471VU, OPEN legends of the four FIRE VALVES annunciators come on.
2. Start engine 1 (engine 2) (Ref. 71-00-00, P. Block 501). Set to idle power.	
3. Operate elevator and ailerons in moving rapidly the control wheel up and down and left and	

ACTION	RESULT
right successively. Result of this move will generate a high flow through the fire valves. The fire closure is tested in real condition.	
- On center pedestal 9VU, select ENG 1 (2) HP fuel shut off valve control lever off.	
- On overhead panel, pull ENG 1(2) FIRE handle.	Engine 1(2) spools down. Green and Blue (Green and Yellow) system fire valves close.

CAUTION : AS THE ENG 1 (ENG 2) FIRE HANDLE IS PULLED, ON CONTROL MODULE 39WD (40WD), BOTH SQUIB LEGENDS COME ON.
DO NOT PRESS THOSE PUSHBUTTON SWITCHES UNLESS NEEDED BY AN ACTUAL FIRE HAZARD.

- Measure valves closing time between extinguishing of OPEN legends and illumination of SHUT legends ; this time must not exceed 5 seconds.	During valve motor operation, OPEN legends of FIRE VALVES/B and G ENG 1 (G and Y ENG 2) annunciators go off. SHUT legends remain off. At end of operation, SHUT legends come on and OPEN legends remain off.
4. Stop operation of servocontrols.	
5. Place ENG 1 FIRE (ENG 2 FIRE) handle in the pushed position.	Green and Blue (Green and Yellow) system fire valves open.
Measure valves opening time, between extinguishing of SHUT legends and illumination of OPEN legends ; this time must not exceed 5 seconds.	During valve motor operation, SHUT legends of FIRE VALVES B and G ENG 1 (G and Y ENG 2) annunciators go off. OPEN legends remain off. At end of operation, OPEN legends come on. SHUT legends remain off.
6. On panel 472VU, place ANN LT switch in OFF position	OPEN and SHUT legends of the four FIRE VALVES annunciators are off
7. Place engine 1 (engine 2) controls in stop position (Ref. 71-00-00, P. Block 501).	

(4)Close-up
(a)In avionics compartment shelf 81VU, on GPCU, press MEMORY CLEAR

pushbutton switch.
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Replace snapwire on ENG1 and ENG2 FIRE handles.

C. Functional Test of Yellow System Fire Valve as the Level is Lowering

(1)Reason for the job

(a)Control and indicating check of Yellow system fire valve after fluid level decrease in Yellow system hydraulic reservoir.

(2)Equipment and materials

ITEM	DESIGNATION
	Access Platform, 3.80 m (15 ft. 5 in.)
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

(3)Procedure

(a)Job set-up

1 Install access platform at zone 671.

2 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

3 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FIRE VALVES/ENG 2	103GK	334/S58
132VU	INTERIOR LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	MAINT PANEL/ANN & MFA	22WB	324/L79

4 Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/WARN	1GR	333/T58

(b)Test

CAUTION : FIRE VALVE MOTORS MUST NOT OPERATE CONTINUOUSLY FOR MORE THAN 30 SECONDS. ALLOW FIRE VALVE MOTORS TO COOL AFTER SIX SUCCESSIVE SEQUENCES.

ACTION	RESULT
1. On panel 472VU, place ANN LT switch in READ position	On panel 471VU, OPEN legends of the four FIRE VALVES annunciators come on.
2. At zone 671, disconnect Yellow system hydraulic reservoir electrical connector 26 GQA. On connector side, shunt terminals F and G.	
3. Close circuit breaker 1GR.	Yellow system fire valve closes. During operation, OPEN legend of

ACTION	RESULT
	FIRE VALVES/Y annunciator goes off. At end of operation, SHUT legend comes on and OPEN legend remains off.
4. - Remove shunt from electrical connector 26GQA. - Connect connector to Yellow system hydraulic reservoir.	After 30 s, Yellow system fire valve opens. During operation, SHUT legend of FIRE VALVES/Y annunciator goes off. At end of operation, OPEN legend comes on and SHUT legend remains off.
5. On panel 472VU, place ANN LT switch in OFF position.	OPEN legends go off SHUT legends remain off.

(4)Close-up
(a)Remove access platform.
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Engine 1 and 2 Hydraulic Pump Indicating and Depressurization

A. Operational Test
(1)Reason for the job
(a)Engine 1 and 2 hydraulic pump control and indicating test.
(2)Equipment and materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

(3)Procedure
(a)Job set-up
1 In flight compartment, make certain that aircraft is in the following configuration :
On HYD PWR panel 427VU, ELEC PUMPS and PTU pushbutton switches released (out).
PUMPS ENG 1/B and G and PUMPS ENG 2/G and Y pushbutton switches pressed (in).
2 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 2/PUMP CTL/Y	1GD	332/U57
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG 1/PUMP/CTL/B	31GJ	331/V57
133VU	ENG 1/PUMP/CTL/G	99GK	331/V58
133VU	ENG 2/PUMP/CTL/G	100GK	332/U58
132VU	INTERIOR LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INTERIOR LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INTERIOR LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INTERIOR LT/ANN LT/TEST/AUTO	153LP	323/M83

3 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Test

ACTION	RESULT
1. In flight compartment, on AIR BLEED panel 436VU, place ANN LT switch in TEST position.	On HYD PWR panel 427VU, OFF and LO PR legends of the four PUMPS ENG 1 and PUMPS ENG 2 pushbutton switches come on. NOTE : Other indications are not to be taken into account during test.
2. Release the four PUMPS ENG1 and PUMPS ENG2 pushbutton switches.	LO PR legends go off. OFF legends remain on.

ACTION	RESULT
Open circuit breaker 5GD.	
3. On AIR BLEED panel 436VU, place ANN LT switch in BRT position. Close circuit breaker 5GD.	OFF legends remain on.
4. On ECAM section of maintenance panel 470VU, press INPUTS TEST pushbutton switch.	On lower center instrument panel 8VU, on left ECAM display unit, check that codes 243, 056 382 and 383 do not appear under DISCRETE INPUT FAULT label for FWC 1 and FWC 2. NOTE : These codes indicate, when they appear on left ECAM display unit a fault in hydraulic pressure detection system on : Green hydraulic pump 1 (code 243) Blue hydrauclic pump (code 056) Green hydraulic pump 2 (code 383) Yellow hydraulic pump (code 382)
5. Release INPUTS TEST pushbutton switch.	
6. On HYD PWR panel 427VU, press the four PUMPS ENG1 and PUMPS ENG2 pushbutton switches.	OFF legends go off, LO PR legends come on.
7. On HYD PWR panel 427VU, release the four PUMPS ENG1 and PUMPS ENG2 pushbutton switches. NOTE : This operation causes energization of pump de-activation solenoid and is audible if one is stationed near engine next to accessory gearbox and hydraulic pumps.	LO PR legends go off, OFF legends come on.
8. On center pedestal, on ECAM control panel, press HYD pushbutton switch and release.	On right ECAM display unit, HYD page is displayed, a horizontal flowbar appears in the engine 1 and 2 rectangles (bars crossline). Flowbars and rectangles are amber.
9. On HYD PWR panel 427VU, press the four PUMPS ENG 1 and PUMPS ENG 2	On right ECAM display unit, on HYD page, LO appears amber.

ACTION	RESULT
pushbutton switches.	
(4)Close-up De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).	

3. Operational Test of Hydraulic System

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Warning Notices
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
**ON A/C 001-100,	
- 71-00-00, P. Block 501	Power Plant - General
**ON A/C 101-200,	
- 71-00-00, P. Block 201	Power Plant - General
**ON A/C ALL	

B. Procedure

NOTE : This procedure is the same for the Green or Blue or Yellow hydraulic system.

(1)Job set-up

(a)Pressurize associated system reservoir (Ref. 29-14-00, P. Block 301).

(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(c)On ECAM control panel, press HYD pushbutton switch and on HYD PWR panel 427VU, make certain that engine-driven pump pushbutton switch(es) of the system in test is(are) pressed (in).

**ON A/C 001-100,

(2)Operational test of hydraulic system

ACTION	RESULT
(a)Dry-motor the engine (Ref. 71-00-00, P. Block 501). NOTE : Engine 1 for the Blue engine-driven pump. Engine 2 for the Yellow engine-driven pump. Engine 1 or 2 for the Green	On the right ECAM display unit, check that the pressure reading is 3000 ± 200 psi (206 ± 13.5 bars) for hydraulic system in test.

ACTION	RESULT
engine-driven pump.	
(b)On HYD PWR panel 427VU : - release pushbutton switch(es) to switch off the pump(s).	On the right ECAM display unit, check that system pressure decreases to 0 psi.
(c)Stop engine dry-motoring (Ref. 71-00-00, P. Block 501).	
(d)On HYD PWR panel 427VU : - push pushbutton switch(es).	

**ON A/C 101-200,

(2)Operational test of hydraulic system

ACTION	RESULT
(a)Dry-motor the engine (Ref. 71-00-00, P. Block 201). NOTE : Engine 1 for the Blue engine-driven pump. Engine 2 for the Yellow engine-driven pump. Engine 1 or 2 for the Green engine-driven pump.	On the right ECAM display unit, check that the pressure reading is 3000 ± 200 psi (206 ± 13.5 bars) for hydraulic system in test.
(b)On HYD PWR panel 427VU : - release pushbutton switch(es) to switch off the pump(s).	On the right ECAM display unit, check that system pressure decreases to 0 psi.
(c)Stop engine dry-motoring (Ref. 71-00-00, P. Block 201).	
(d)On HYD PWR panel 427VU : - push pushbutton switch(es).	

**ON A/C ALL

(3)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Remove warning notices.

4. Operational Test of Autopilot Roll Actuator

A. Reason for the Job
To make sure that the Green system supplies the roll AP1 and that the Yellow system supplies the roll AP2.

B. Equipment and Materials

ITEM	DESIGNATION
(1) 98A27901000000	Rigging Pin
(2) 98A27207543000	Rigging Pin
(3) 98A27108014000	Rigging Pin
Referenced Procedures	
- 22-13-25, P. Block 401	Autopilot Roll Actuator
- 22-26-00, P. Block 1	Yaw Damper
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power (Pressurization/ Depressurization)
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 34-10-00, P. Block 501	Flight Environment Data
- 34-25-00, P. Block 501	Inertial Reference System (IRS)

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Pressurize the aircraft hydraulic system(s) (Ref. 29-10-00, P. Block 301).
(c)Hydraulic pressure configuration
1 For test of AP1 side :
- Blue system available for YAW DAMPER 1 engagement (Ref. 29-22-00, P. Block 301),
- Green system available for AP1 engagement (Ref. 29-21-00, P. Block 301),
- Yellow system must be isolated to check correct hydraulic tubing connection.

2 For test of AP2 side :
- Yellow system available for YAW DAMPER 2 and AP2 engagement (Ref. 29-23-00, P. Block 301),
- Green system must be isolated to check correct hydraulic tubing connection,

NOTE: Green system can be isolated at servo control panel if Yellow system is pressurized through PTU.

- overhead panel circuit breakers closed, particularly those associated with AFS, NAVIGATION, ADS and ECAM,
- aircraft in ground configuration (L/G PROX DET & RELAYS circuit breakers on panel 133VU, closed),
- ADS operating (Ref. 34-10-00, P. Block 501),
- IRS 1, 2 and 3 aligned (perform ALIGN procedure until red HDG

flags on NDs disappear, present position entering is not necessary) (Ref. 34-25-00, P. Block 501),
- EFIS operating by adjustment on panels 412VU, 413VU of PFD and ND brightness,
- on center pedestal ECAM display unit brightness adjusted and FLT CTL page selected,
- on overhead panel, PITCH TRIM 1 and YAW DAMPER 1 engaged (Ref. 22-26-00, P. Block 1),
- make certain that the aileron control wheel is in the zero position,
- make certain that the rigging pin P/N 98A27901000000 can be freely installed in the aileron control wheel. If necessary, do the procedure given in 22-13-25, P. Block 401 until the rigging pin P/N 98A27901000000 can be freely installed.
- Remove the rigging pin P/N 98A27901000000.

(2)Test

ACTION	RESULT
1. On SERVO CTL section of panel 428VU : - release (out) the Y P/BSW.	- the related OFF legend comes on, - the related SERVO CTL/LO PR warning light comes on.
2. On the Flight Control Unit (FCU) : - put the AP1 lever in the ON position,	On the FCU : - the lever stays engaged, - the green CWS comes on. On the PFDs : - the amber CWS1 indication comes on.
- push (in) the CWS/CMD P/BSW.	On this P/BSW : - the green CWS goes off, - the green CMD comes on. On the PFDs: - the white CMD1 indication comes on, - the amber CWS1 indication goes off, - the green HDG is displayed.
3. Put one person in position adjacent to each aileron. When you do step 4. (disengage AP1) examine for absence of aileron surface movement.	
4. Disengage the AP1 and cancel the warning.	No aileron movement is permitted. If aileron movement is detected : - insert the rigging pins P/N 98A27108014000, P/N 98A27207543000, and P/N 98A27901000000, - do the rigging procedure given in 22-13-25, P. Block 401 again then

ACTION	RESULT
	remove the rigging pins, - do the steps 2. thru 4. until no aileron movement is detected.
5. On the flight control unit (FCU) : - put the AP1 lever in the ON position,	On the FCU : - the lever stays engaged, - the green CWS comes on. On the PFDs : - the amber CWS1 indication comes on.
- push (in) the CWS/CMD P/BSW.	On this P/BSW : - the green CWS goes off, - the green CMD comes on. On the PFDs : - the white CMD1 indication comes on, - the amber CWS1 indication goes off, - the green HDG is displayed.
6. On the flight control unit (FCU) : - with HDG SEL selector knob select heading deviation of 10 deg. to right.	On the NDs : - the heading index moves in relation.
- pull HDG SEL selector knob.	On the FCU : - HDG SEL P/BSW comes on green. On the PFDs : - the green HDG goes off, - the green HDG/S comes on. The control wheel rotates to the right.
- select a heading deviation equal to the heading.	The control wheel returns towards the neutral position.
7. On SERVO CTL section of panel 428VU : - push (in) Y P/BSW,	- the related SERVO CTL/LO PR warning light goes off, - the related OFF legend goes off.
- release (out) G P/BSW.	- the related OFF legend comes on, - the related SERVO CTL/LO PR warning light comes on.
8. On the flight control unit (FCU) : - engage AP2 in CMD.	On the PFDs : - the white CMD2 indication comes on, - the green HDG is displayed.

ACTION	RESULT
9. Do the same operations as in step 6.	Same results as step 6.
10. Disengage the AP2 and cancel the warning.	
11. On SERVO CTL section of panel 428VU : - push (in) G P/BSW.	- the related SERVO CTL/LO PR warning light goes off, - the related OFF legend goes off.
12. On the overhead panel : - put the PITCH TRIM 1 engage lever in the OFF position.	

(3) Close-up
  (a) Depressurize the aircraft hydraulic system(s) (Ref. 29-10-00, P. Block 301).
  (b) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
  (c) Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.

1. Cleaning Requirements After Chemical Contact With Hydraulic Fluid

A. General

This procedure gives direction on how to clean the engine after chemical contact with hydraulic fluid.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 70-00-00, P. Block 201	Standard Practices

C. Procedure

(1) If necessary, clean the engine to remove the hydraulic fluid by SPOP 425 (Ref. 70-00-00, P. Block 201).

GREEN MAIN HYDRAULIC POWER - DESCRIPTION AND OPERATION

1. General

This system is the most important of the three.

- It includes one pump on each of the two engines.
- It actuates directly the majority of the user services except :
  - . Twelve of the fourteen spoilers.
  - . The flap and slat wing tip brakes (sub-system not affected by any wing tip damage).
  - . The yaw damper.
  - . The cargo compartment doors.
- It can operate independently on the ground by means of the APU and the electric pumps : 29-21.
- It is used to pressurize the other systems by means of the power transfer units :
  Green/Blue .....29-22.
  Green/Yellow .....29-23.
- In addition, the Green system ground service panel features controls and indicators for the reservoir filling system.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)
(Ref. Fig. 003)
(Ref. Fig. 004)
(Ref. Fig. 005)
(Ref. Fig. 006)
(Ref. Fig. 007)
R (Ref. Fig. 008)

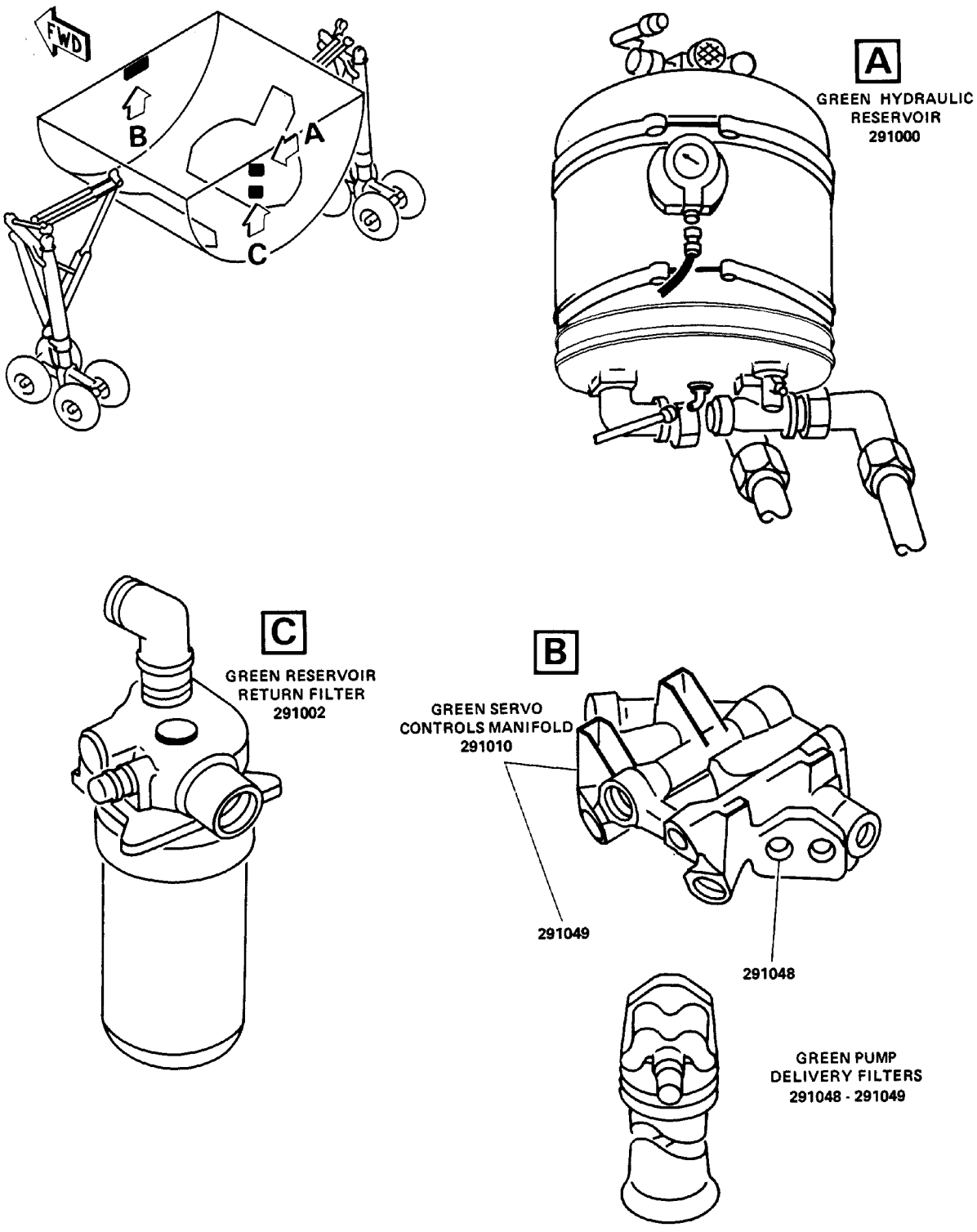
**ON A/C 101-103, 105-200,

(Ref. Fig. 009)

**ON A/C 101-200,

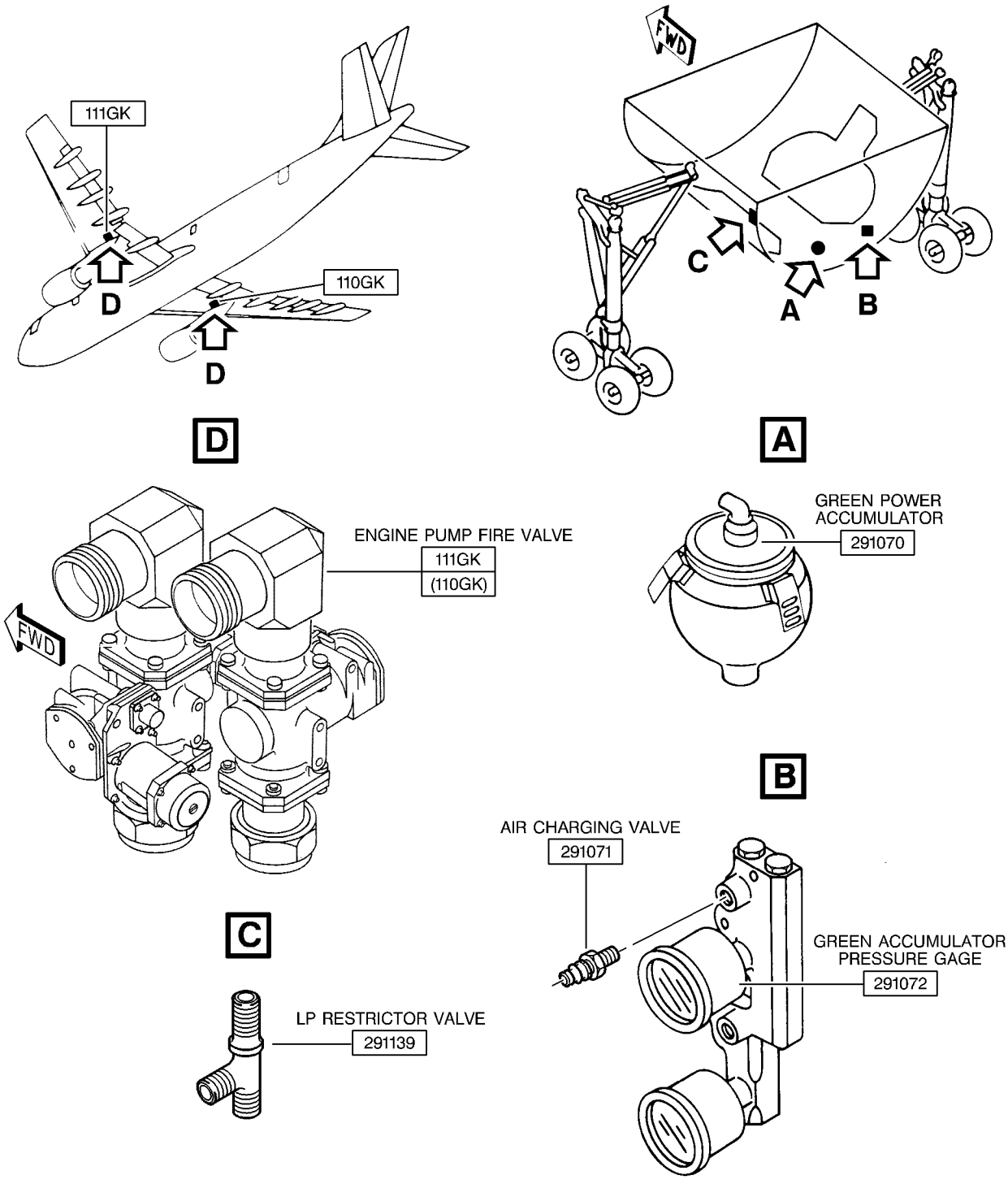
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
291000	RESERVOIR-HYDRAULIC, GREEN		147	734	29-11-11
291002	FILTER-RSVR RETURN, GREEN		147	734	29-11-15
291004	MANIFOLD-LP, GREEN		147	734	
291005	VALVE-DEPRESS RELIEF, G RSVR		147	147AL	
291006	GROUND CONNECTOR-SUCTION, G		147	147AL	
291007	GROUND CONNECTOR-FILLING, G		147	147AL	
291008	GROUND CONNECTOR-DELIVERY, G		147	147AL	
291010	MANIFOLD-SERVO CONTROLS, G		147	734	29-11-34
291030	PUMP-GREEN, ENG1		452	436AL	29-11-32
291031	PUMP-GREEN, ENG2		462	446AR	29-11-32
111GK	VALVE-ENGINE PUMP FIRE, ENG1		575	575AL	29-11-33

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	110GK	VALVE-ENGINE PUMP FIRE, ENG2		675	675AL	29-11-33
R	291038	SELF-SEALING COUPLING HALF		410	435AL	29-11-67
R	291039	SELF-SEALING COUPLING HALF		420	445AL	29-11-67
R	291040	VALVE-NON RETURN		473	473AL	29-11-65
R	291041	VALVE-NON RETURN		473	473AL	29-11-65
R	291042	VALVE-NON RETURN		483	483AL	29-11-65
R	291043	VALVE-NON RETURN		483	483AL	29-11-65
	291048	FILTER-G PUMP DELIVERY, ENG1		147	734	29-11-42
	291049	FILTER-G PUMP DELIVERY, ENG2		147	734	29-11-42
	112GK	PRESS SWITCH-G PUMP, ENG2		483	483AL	29-11-62
	113GK	PRESS SWITCH-G PUMP, ENG1		473	473AL	29-11-62
R	291700	MANIFOLD-ENGINE PYLON		473	473AL	29-11-61
R	291701	MANIFOLD-ENGINE PYLON		483	483AL	29-11-61
R	291702	RESTRICTOR-GREEN PUMP RECIRCULATION, ENG1		473	473AL	29-11-61
R	291703	RESTRICTOR-GREEN PUMP RECIRCULATION, ENG2		483	483AL	29-11-61
	291060	MANIFOLD-HP, GREEN		147	734	29-11-12
	291063	RELIEF VALVE-GREEN PUMPS DELIVERY		147	734	29-11-55
	291064	PRIORITY VALVE-GREEN		147	734	27-14-14
	291070	ACCU-GREEN PWR		147	734	29-11-56
R	291071	AIR CHARGING VALVE		148	734	29-32-25
R	291072	PRESS GAGE-GREEN ACCU		148	734	29-32-21
	30WW	PRESS SWITCH-HP MANIFOLD, G		147	734	
	291015	CHECK VALVE-L/G RETURN, G		147	734	
	291019	CHECK VALVE-PTU RETURN, G		147	734	
	291020	CHECK VALVE-CASE DRAIN RETURN, G		147	734	
	291021	CHECK VALVE-FLAPS AND SLATS RETURN, G		147	734	
	291022	CHECK VALVE-RETURN, G HP MANIFOLD		147	734	
	291023	CHECK VALVE-L/G RETURN, G		147	734	
	291024	CHECK VALVE-BRK RETURN, G		147	734	
	291026	CHECK VALVE-RETURN, G/B PTU		147	734	
	291050	CHECK VALVE-G PUMP DELIVERY, ENG 1		147	734	
	291051	CHECK VALVE-G PUMP DELIVERY, ENG 2		147	734	
	291080	CHECK VALVE-G ELEC PUMP DELIVERY		147	734	
	291131	CHECK VALVE-G RSVR FILLING		147	734	
R	291139	LP RESTRICTOR VALVE		147	734	29-16-12
	**ON A/C 101-103, 105-200,					
		VALVE-PRESSURE RELIEF		147	734	29-11-11



BM5 29 11 00 0 DDM0 – 00

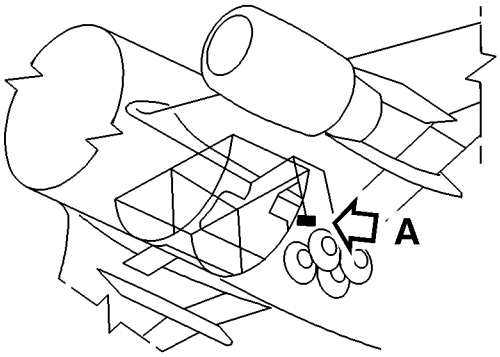
Component Location
Figure 001



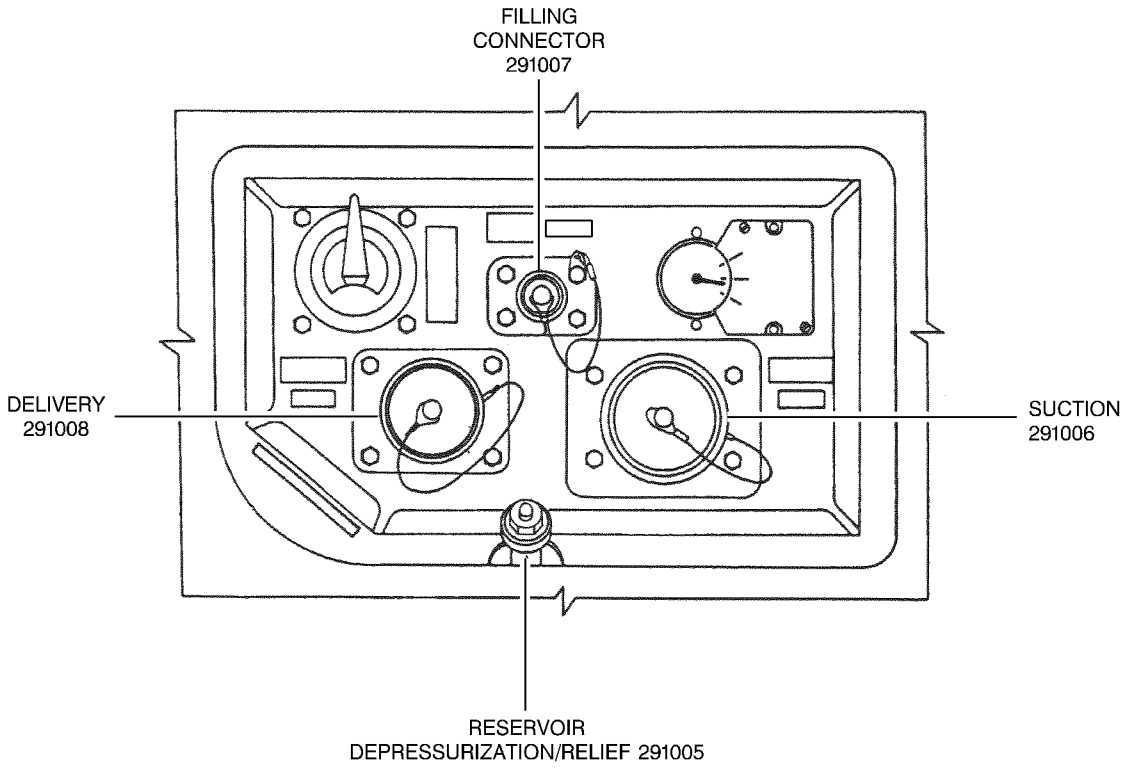
BM5 29 11 00 0 BBM0 01

R

Component Location
Figure 002



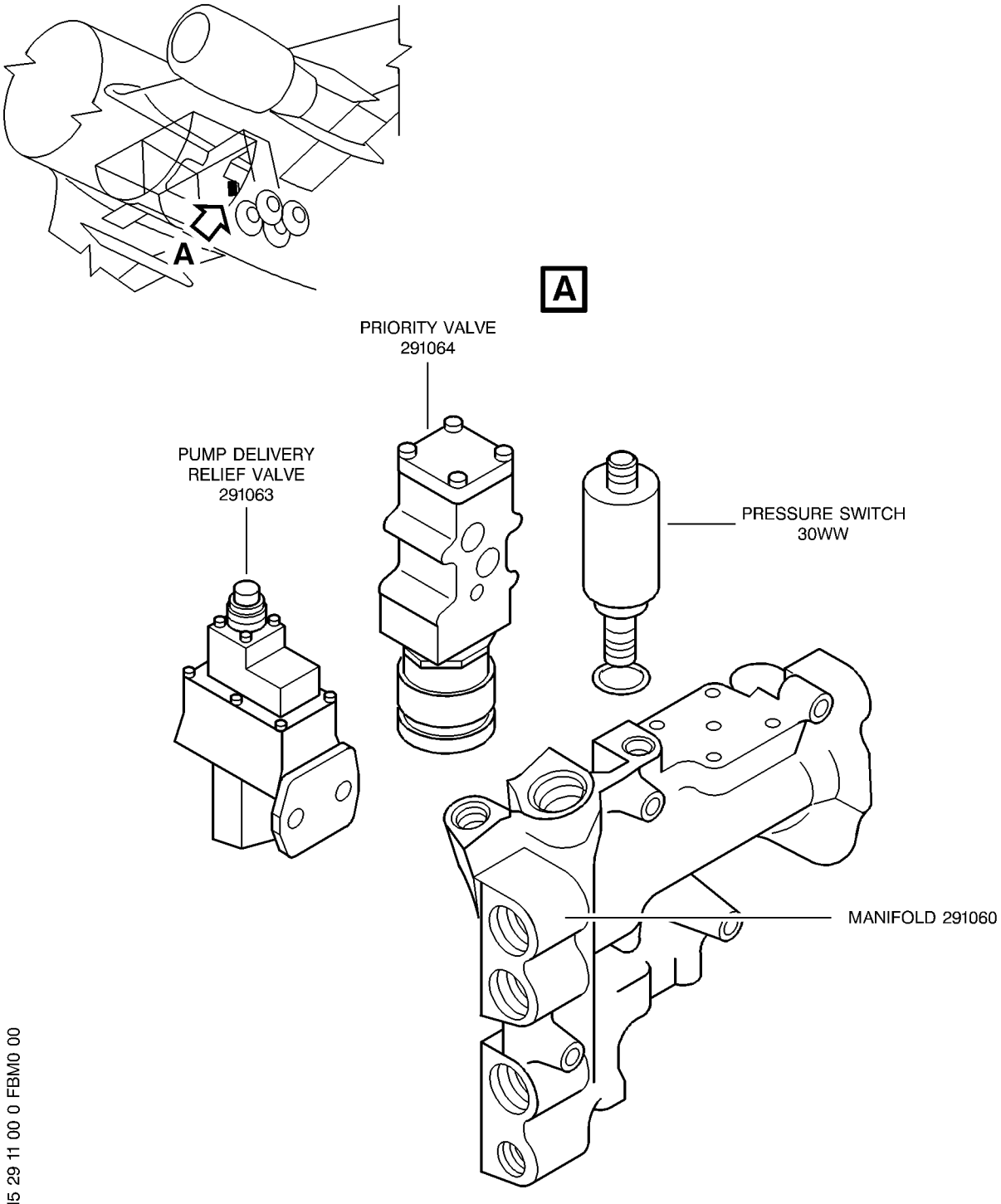
A



BM5 29 11 00 0 BYM0 01

R

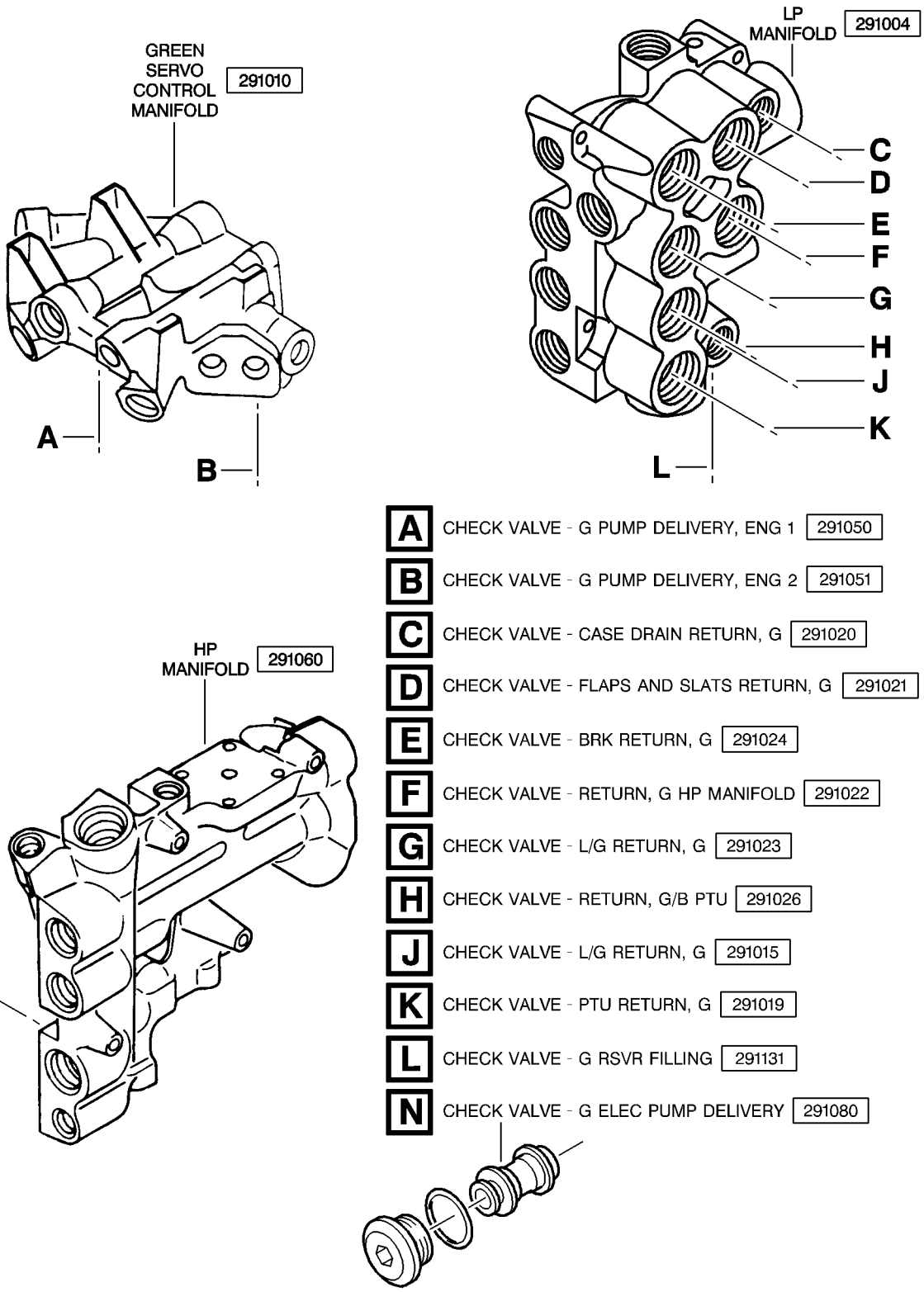
Component Location
Figure 003



BM5 29 11 00 0 FBM0 00

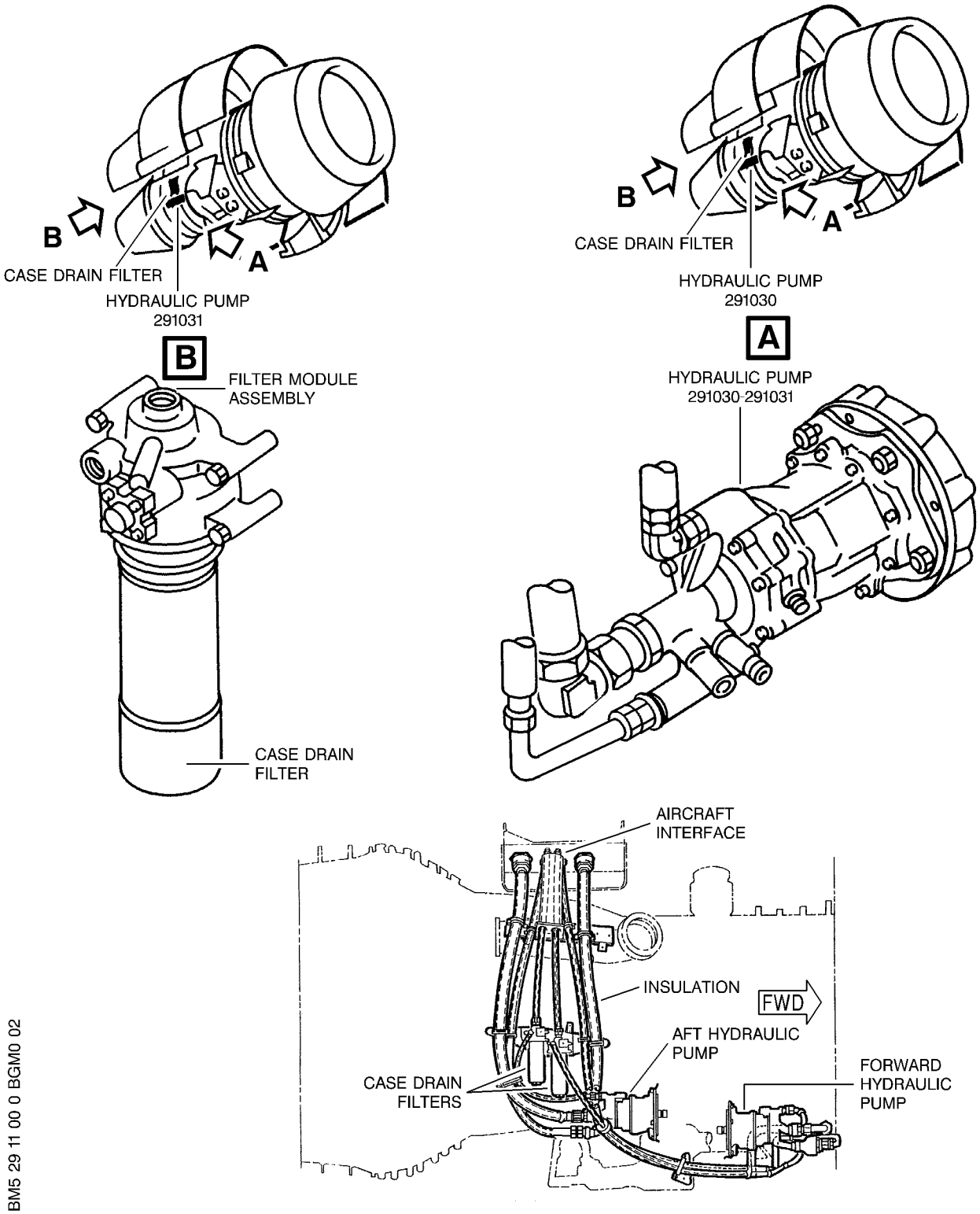
Component Location
Figure 004

R


GREEN SERVO CONTROL MANIFOLD 291010
A
B
LP MANIFOLD 291004
C
D
E
F
G
H
J
K
L
HP MANIFOLD 291060
N
A CHECK VALVE - G PUMP DELIVERY, ENG 1 291050
B CHECK VALVE - G PUMP DELIVERY, ENG 2 291051
C CHECK VALVE - CASE DRAIN RETURN, G 291020
D CHECK VALVE - FLAPS AND SLATS RETURN, G 291021
E CHECK VALVE - BRK RETURN, G 291024
F CHECK VALVE - RETURN, G HP MANIFOLD 291022
G CHECK VALVE - L/G RETURN, G 291023
H CHECK VALVE - RETURN, G/B PTU 291026
J CHECK VALVE - L/G RETURN, G 291015
K CHECK VALVE - PTU RETURN, G 291019
L CHECK VALVE - G RSVR FILLING 291131
N CHECK VALVE - G ELEC PUMP DELIVERY 291080

BM5 29 11 00 0 DRM0 01

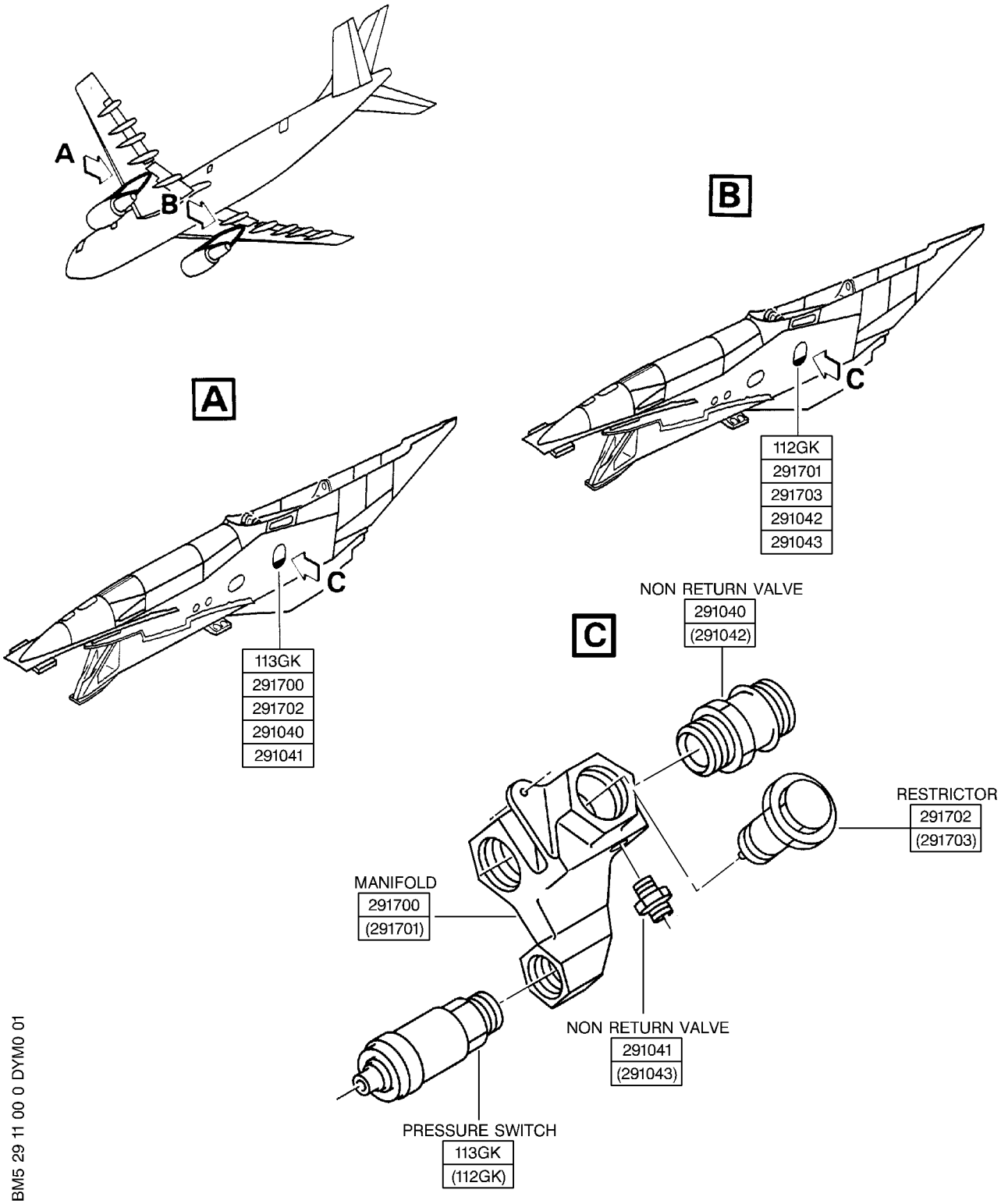
Component Location
Figure 005



BM5 29 11 00 0 BGM0 02

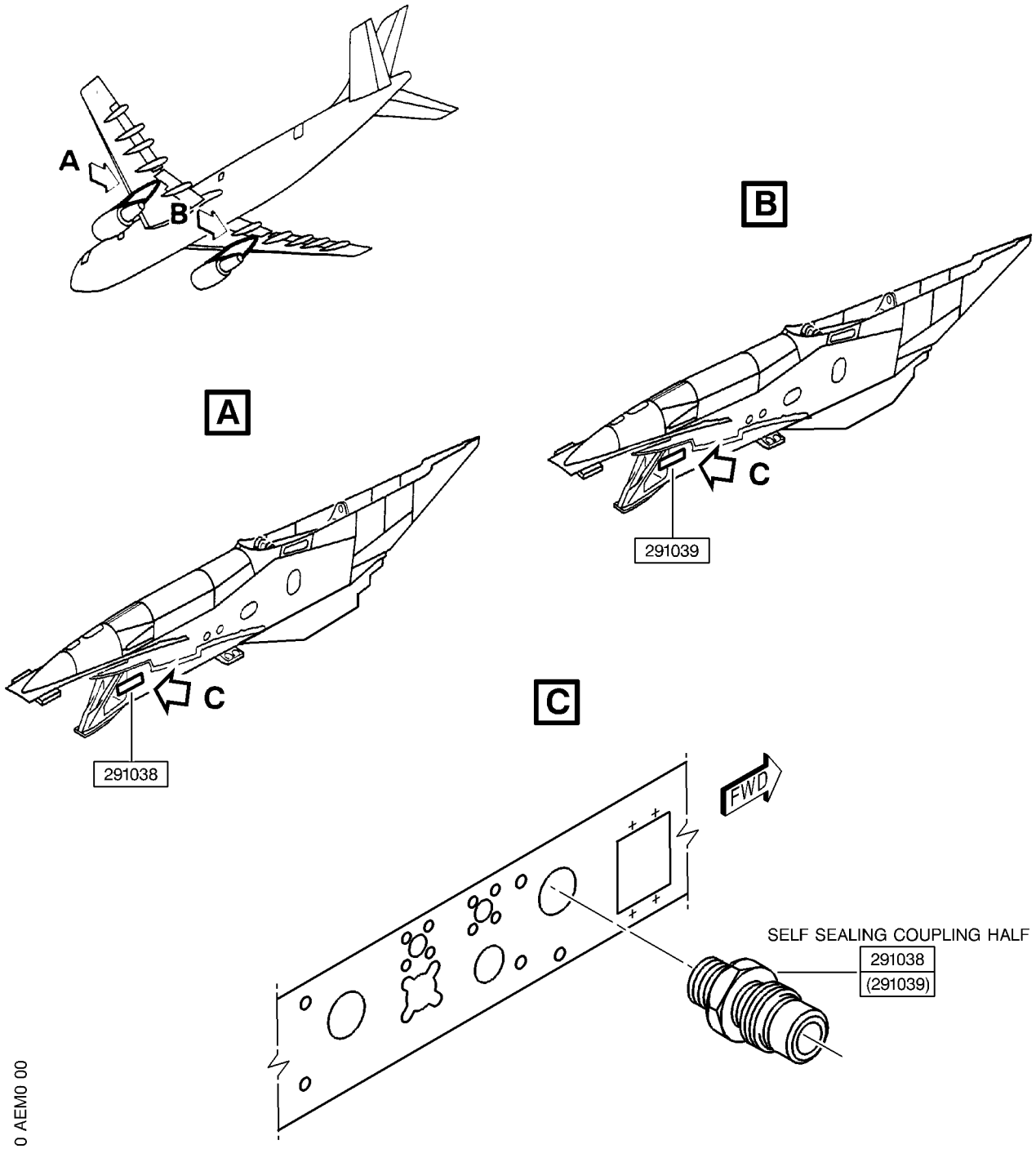
Component Location
Figure 006

R



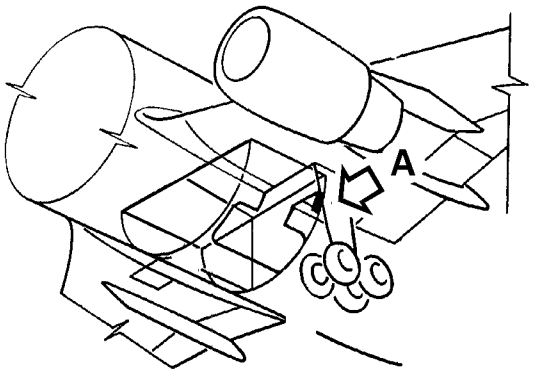
Component Location
Figure 007

R



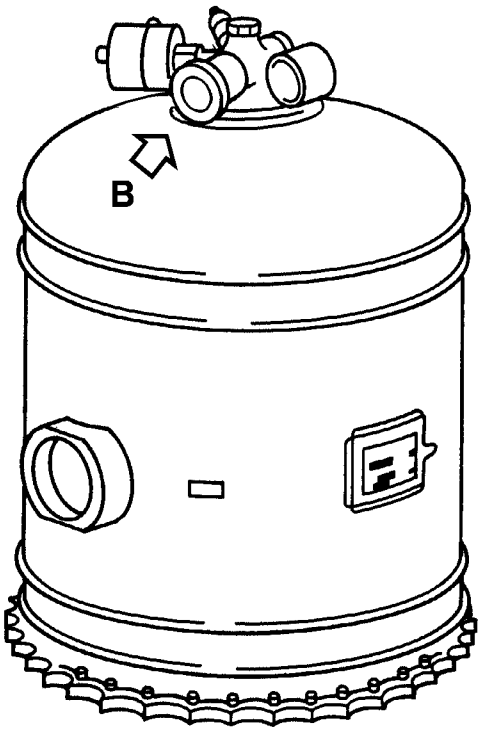
BM5 29 11 00 0 AEM0 00

R Component Location
Figure 008



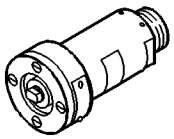
A

GREEN HYDRAULIC
RESERVOIR 291000



B

PRESSURE RELIEF VALVE



BM5 29 11 00 0 BHM0 00

Component Location
Figure 009

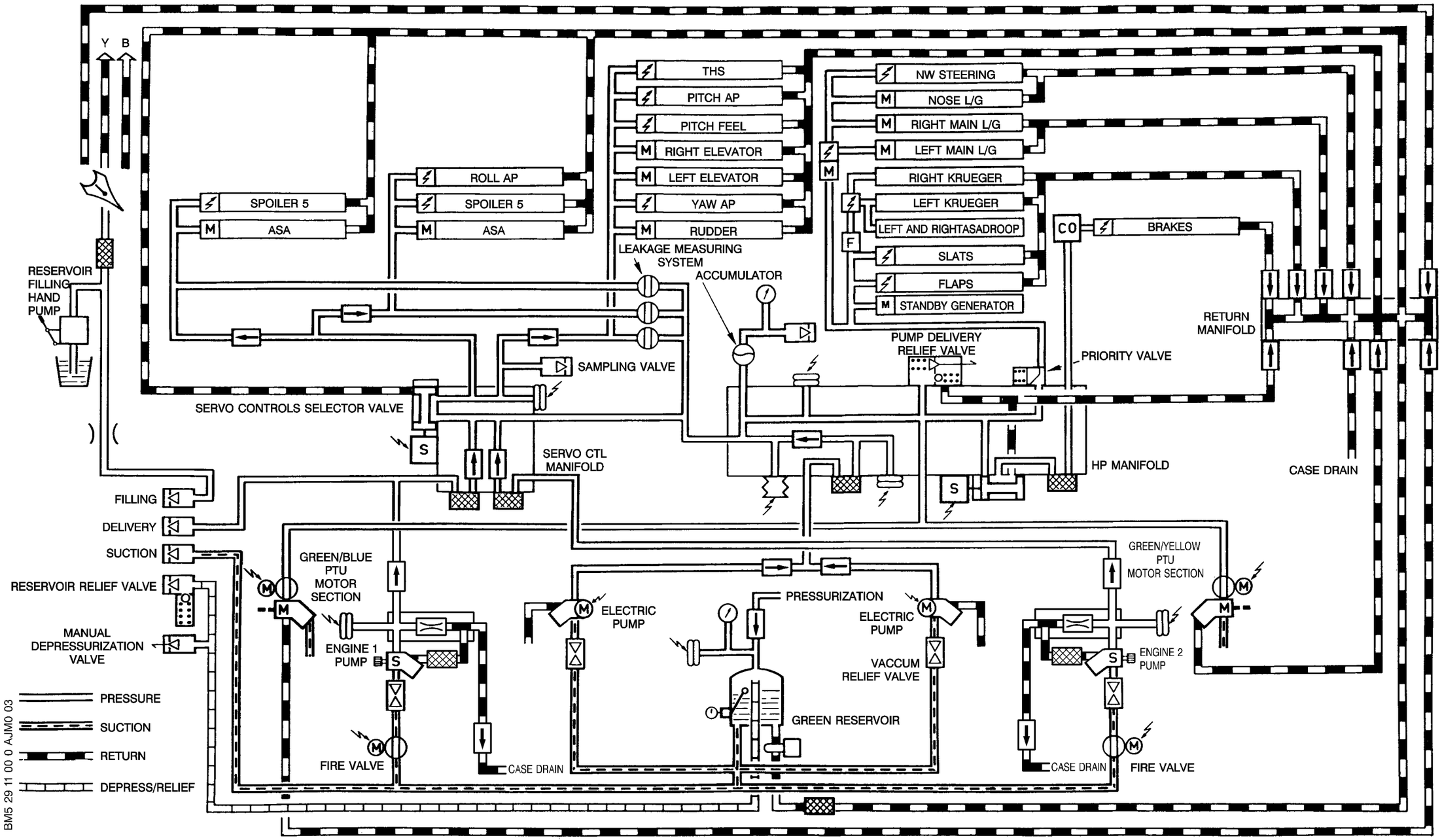
**ON A/C 101-200,

3. Users
(Ref. Fig. 010)

A. Supplied through the servo controls manifold, with independent supply capability on the ground
. of the L wing
R
. of the aft fuselage
Leakage measurement by means of isolation valves
. Two all speed aileron servo controls — L and R ASA
. Two elevator servo controls — L and R
. One rudder servo control
. Two actuators on spoilers 5, L and R — 5th outboard from the fuselage.
. One trimmable horizontal stabilizer actuator motor — THS
. One autopilot roll actuator servomotor
. One autopilot pitch actuator servomotor
. One autopilot yaw actuator servomotor
. One pitch artificial feel actuator.

B. Supplied through the HP manifold
. Two hydraulic motors of the Green/Blue and Green/Yellow power transfer units.
. The normal braking system for the eight main landing gear wheels.
And through a priority valve :
. Two hydraulic motors in the flap and slat power control units.
. Two Krueger flap actuators.
. Two droop actuators
. Landing gear extension/retraction and nose wheel steering systems
i.e : three landing gear actuating cylinders
three downlock systems
four landing gear door actuating cylinders
seven landing gear and landing gear door uplocks with uplock release actuators
two nose wheel steering actuating cylinders powered in parallel with the landing gear extension system.
Standby generator..... 24-24.

Printed in France



Green Hydraulic Power System
Figure 010

R

4. Reservoirs
(Ref. Fig. 011)
(Ref. Fig. 012)

A. Purpose
. Each hydraulic system includes a reservoir which compensates for variations in fluid volume due to user service operation, and provides a reserve supply of fluid.
Reservoir volume included ; the volume of fluid in each system is approximately 170 l (44.8 US Gal) for Green system, 85 l (21.14 US Gal) for Blue system and 120 l (31.6 Us Gal) for Yellow system.
. The three reservoirs are air-pressurized to 3.5 bars (50.8 psi).
. Each reservoir is designed to remains pressurized for at least 12 hours.

B. Description
. The reservoirs are attached to the aircraft structure by two clamp-secured straps. They each consist of a sheet steel cylinder with a molded light alloy base. Cylinder diameter is the same for each reservoir. Their relative capacities are therefore determined by their height.

	Green	Blue	Yellow
Total	40 l (10.57 USgal)	22 l (5.81 USgal)	28 l (7.4 USgal) ±3 l (0.79 USgal) (reserve)
Max gageable	30 l (7.93 USgal)	17 l (4.49 USgal)	24 l (6.34 USgal)
Fill level	17 l (4.49 USgal)	12 l (3.17 USgal)	18.5 l (4.89 (USgal)
Low level warning	5 l ±0.5 (1.32 USgal ±.13)	5 l ±0.5 (1.32 USgal ±.13)	

The level of the three reservoirs may be adjusted separately at the Green system ground service panel.
The yellow reservoir includes a reserve for RAT supply
- Air-fluid contact is direct.
- A compartment feature ensures positive fluid supply to the pumps during negative "g"" conditions of up to 20 seconds.
- An internal device limits emulsion in the event of substantial return flow.

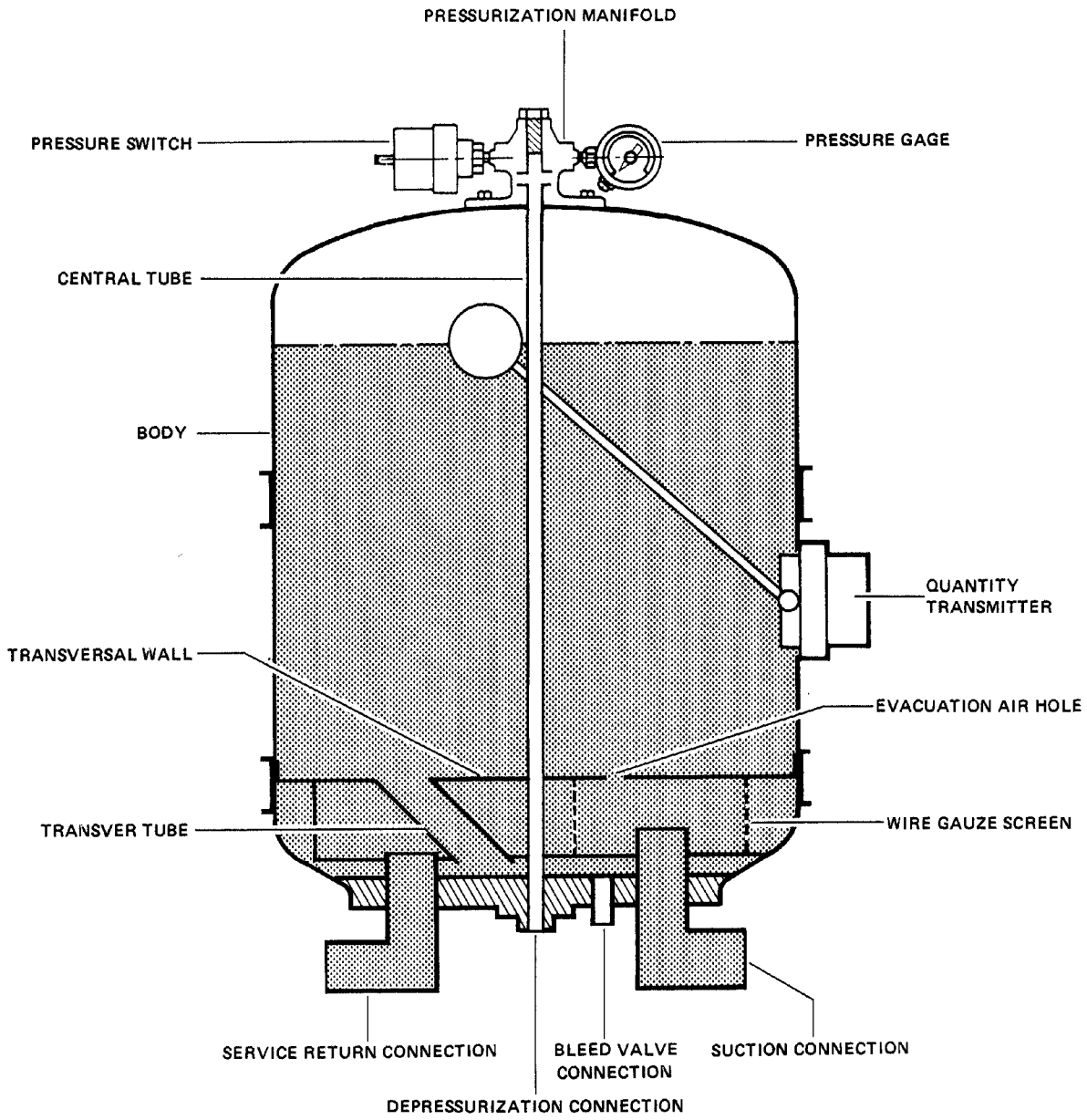
C. Accessory Components
. The top of each reservoir is equipped with a pressurization manifold, including :
. A check valve on the air supply line.
. A direct reading air pressure gage (Accuracy ± 2° of angle)
. An air pressure switch which signals low pressure conditions to the flight compartment.

**ON A/C 104-104,

. A blanking cap.

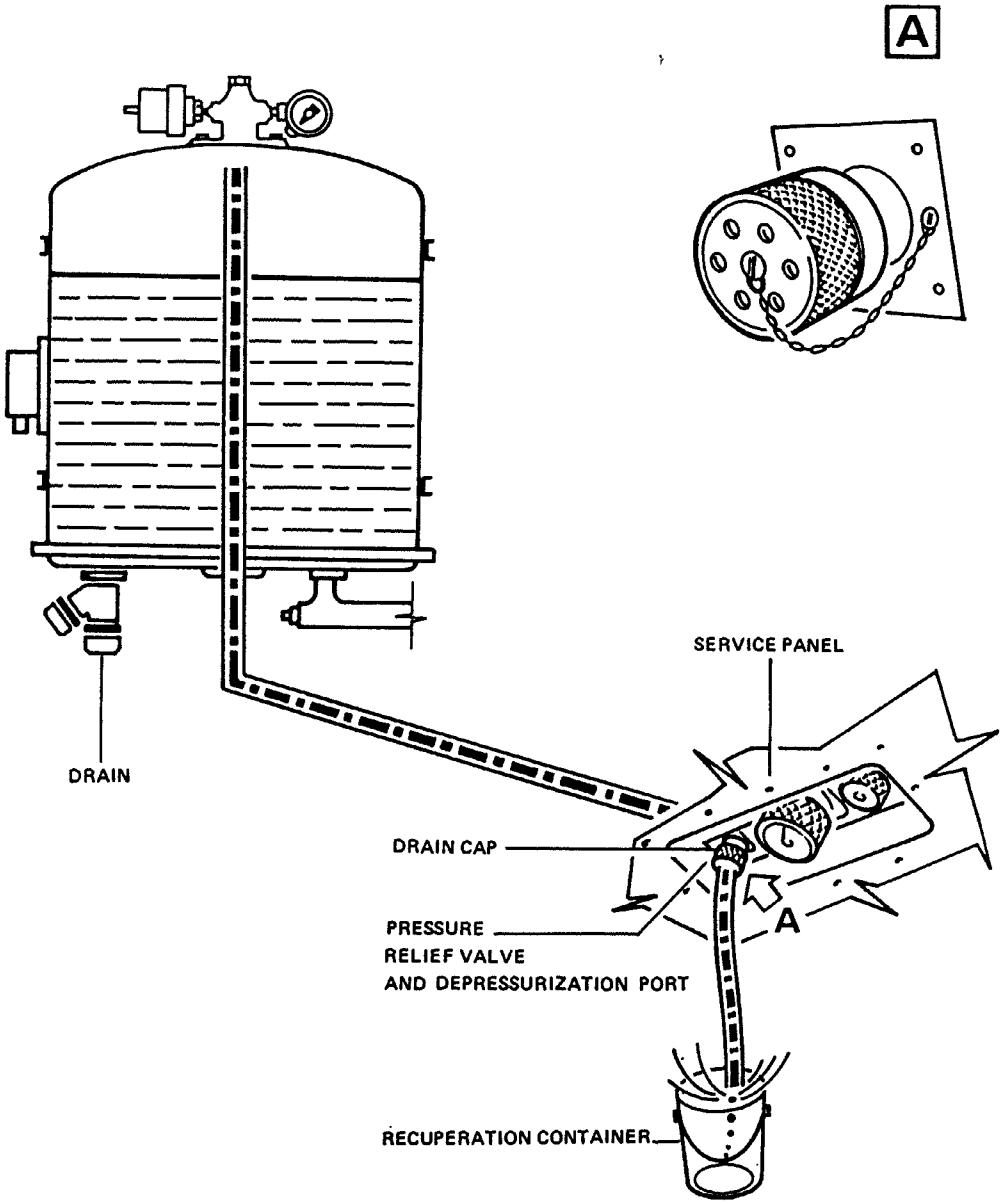
**ON A/C 101-103, 105-200,

. A pressure relief valve.



BM5 29 11 00 0 DBM0 – 00

Green Reservoir Schematic
Figure 011



BM5 29 11 00 0 DCMO - 11

Reservoir Depressurization
Figure 012

**ON A/C 101-200,

(Ref. 29-34)
Midway down the reservoir is mounted a quantity transmitter comprising :
. A float, with actuating linkage and snubber.
. A direct reading quantity gage.
. An electrical connector for transmitting quantity signals and low level warnings to the flight compartment and to the Green system ground service panel.
(Ref. 29-31)
The bottom of the reservoir includes :
. A suction port for supply of fluid to the pumps (± one for the ram air turbine on the Yellow system reservoir).
. A return port with an overheat sensor.
(Ref. 29-33)
. A port connected to a self-sealing depressurization/relief valve in the ground service panel. (Ref. Fig. 012)
. A drain valve.

D. Component Operating Settings
- Air pressure switch :
1.5 ± 0.1 bars (21.75 ± 1.45 psi) - pressure decreasing
1.7 bars (24.65 psi) maximum - pressure increasing.
- Depressurization/relief valve
(4.2 ± 0.3 - 0.2 bars) (60.9 ± 4.35 - 2.90 psi) - pressure increasing (opening)
3.7 ± 0.1 bars (53.66 ± 1.45 psi) - pressure decreasing (closing).
- In the event of pressurization loss, pressure in reservoir will not be lower than 3 bars (relative pressure) after 3 hours operation.

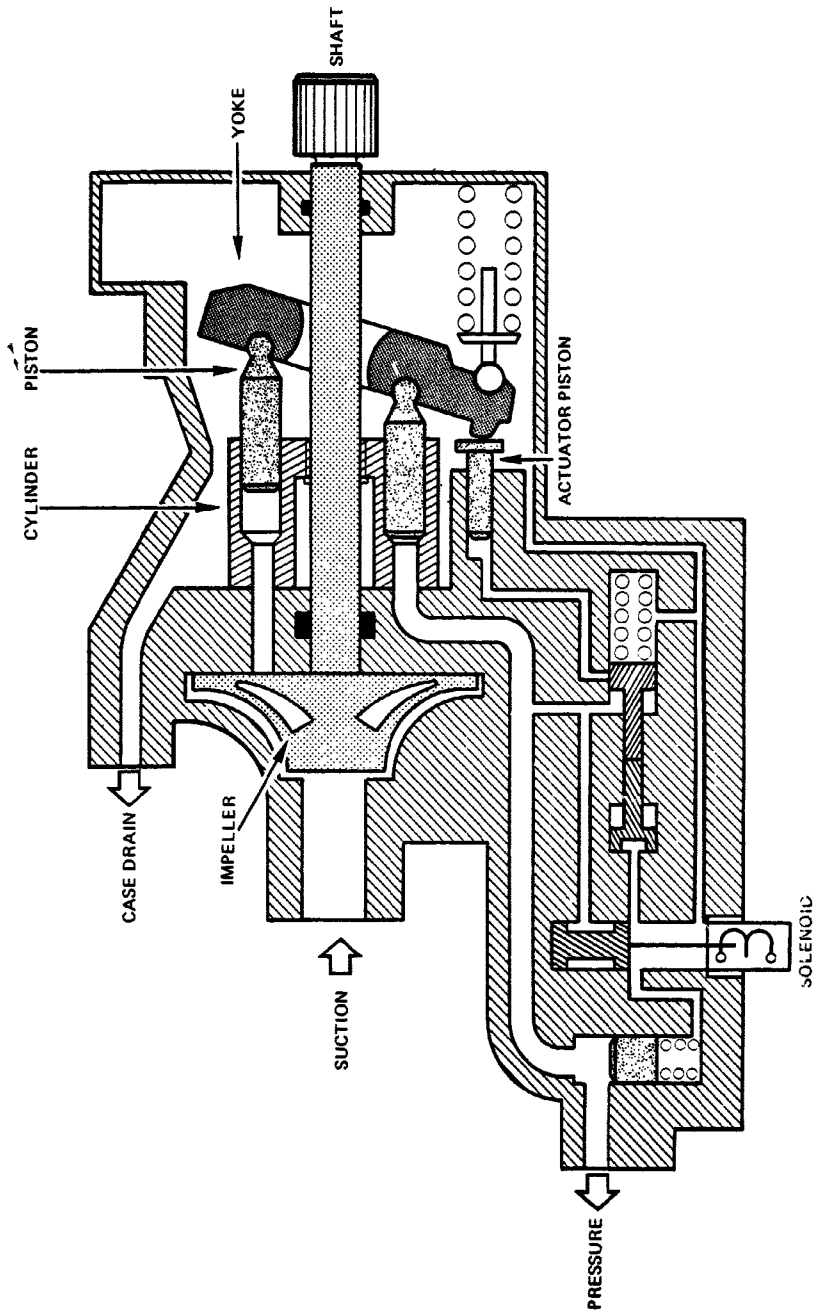
5. Engine Pumps
(Ref. Fig. 013)
(Ref. Fig. 014)
(Ref. Fig. 016)
When the engines are running, these pumps are normally used alone to pressurize the hydraulic systems.

A. Location and Drive
The pumps are mounted on and driven by the engine accessory gearboxes, which in turn are driven by the HP compressor :
One Green system pump and the Blue system pump are mounted under engine 1.
One Green system pump and the Yellow system pump are mounted under engine 2.
Rotational movement is transmitted to the pump by a splined shear-type drive shaft. A drain manifold recovers any oil leakage from the accessory gearbox end and any hydraulic fluid leakage from the pump end, allowing the origin of the leakage to be determined and the accessory gearbox seal or pump seal to be changed.

B. Description and Leading Particulars
The four pumps are of the variable displacement type and are identical. They include nine pistons to which rotational motion is imparted by a cylinder block, and reciprocating motion by a variable-angle yoke. Varying the angle of the yoke allows nominal pressure to be maintained within a wide range of delivery volumes, proportional to engine speed. Servo pressure for changing the yoke angle is delivered by a compensator valve, spring loaded in one direction and outlet pressure actuated in the other.
. Nominal fluid : 136 + 5 l/mn - 0 (35.93 + 1.3 US gal/mn) - 0 at rated delivery speed of 3540 rpm.
i.e 90.87% N2 for engine (PW)
. Nominal pressure : 206 + 3 - 0 bars (3000 psi) at zero delivery.
196 bars (2842.7 psi) at nominal delivery.
. (Ref. Fig. 016) indicates pump rotation speeds according to the flight phases, these corresponding to a typical 90 mn flight.
NOTE : minimum engine idling speed :
- for engine (PW) : N2 = 4014 rpm, hence a pump rotation speed of 2003 rpm and fluid delivery of 79.2 l/mn (20.91 US Gal)
. Case drain leakage rate is approximately 2.5 GPM for a pump rotation speed of 3750 rpm.

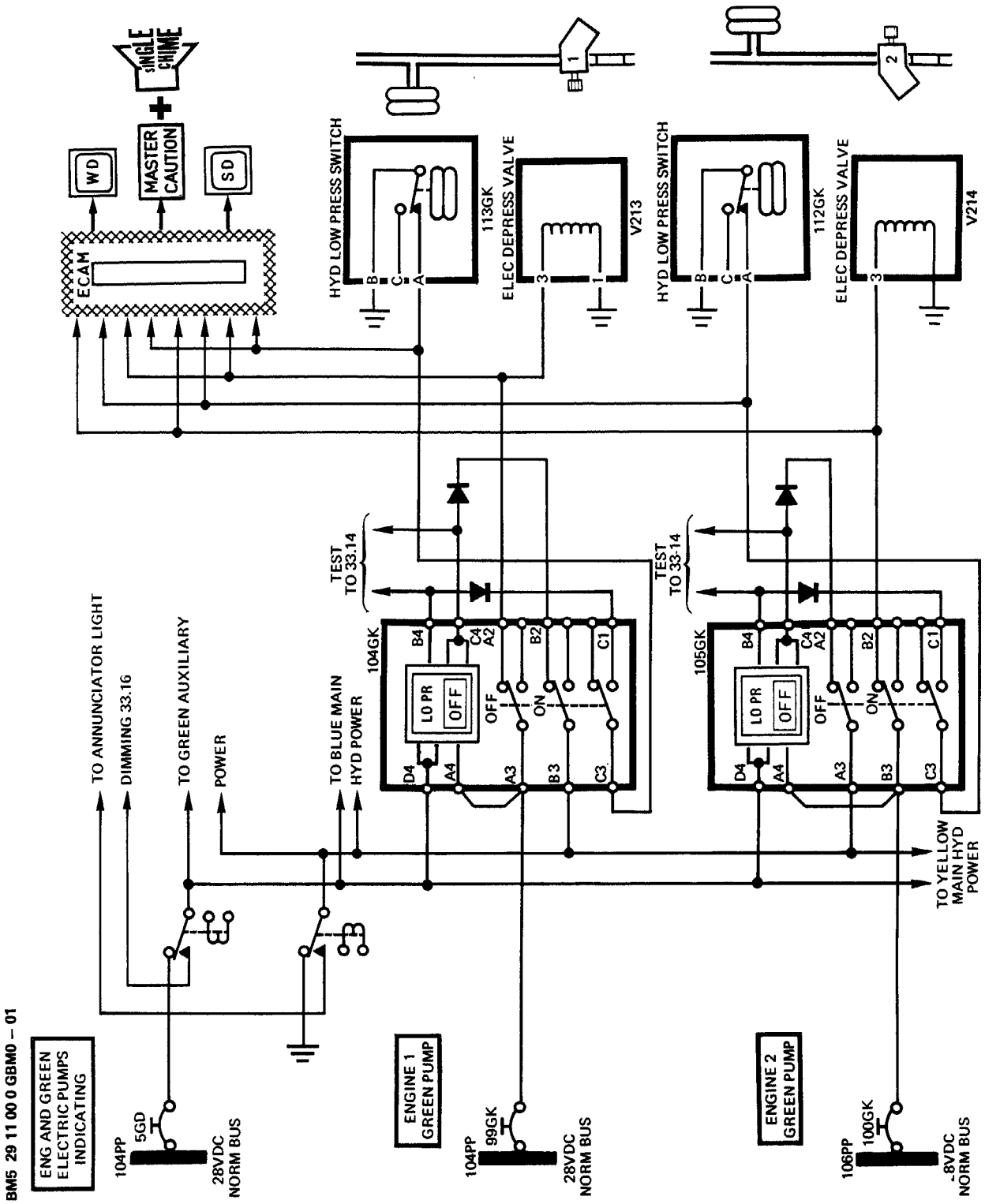
C. Pump Deactivation
Each pump is deactivated by releasing the associated pushbutton switch on the overhead panel. This activates the pump depressurizing valve solenoid. A blocking valve then isolates delivery whilst the yoke is repositioned perpendicular to the drive shaft to reduce delivery to almost zero. The pump is lubricated by internal leakage.

D. Hydraulic Connections (Ref. Fig. 015)
The pumps are connected to the engine pylon by high temperature resistant flexible hoses and stainless steel pipes, allowing quick removal of the



BM5 29 11 00 0 ACMO

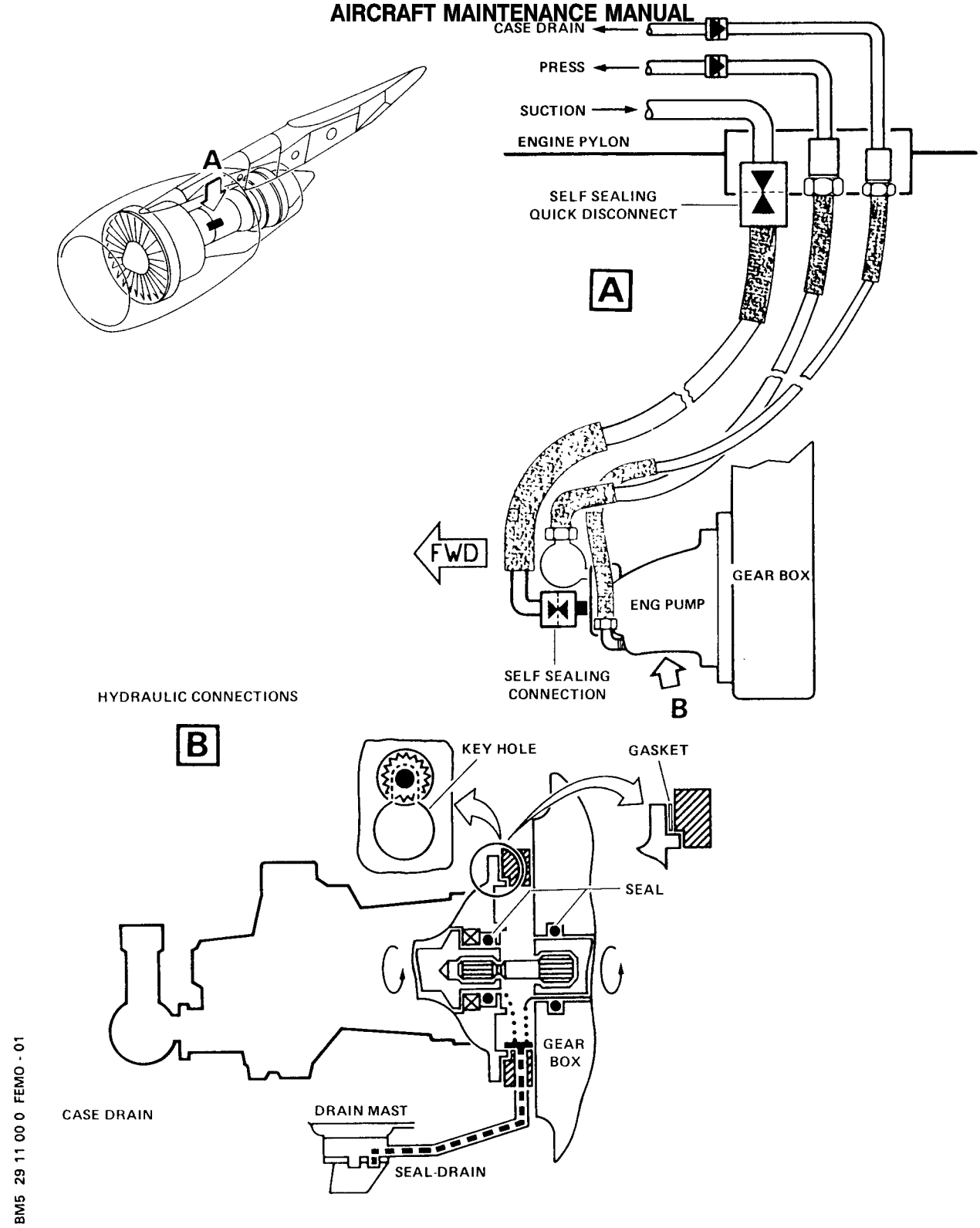
Engine Pump - Schematic
Figure 013



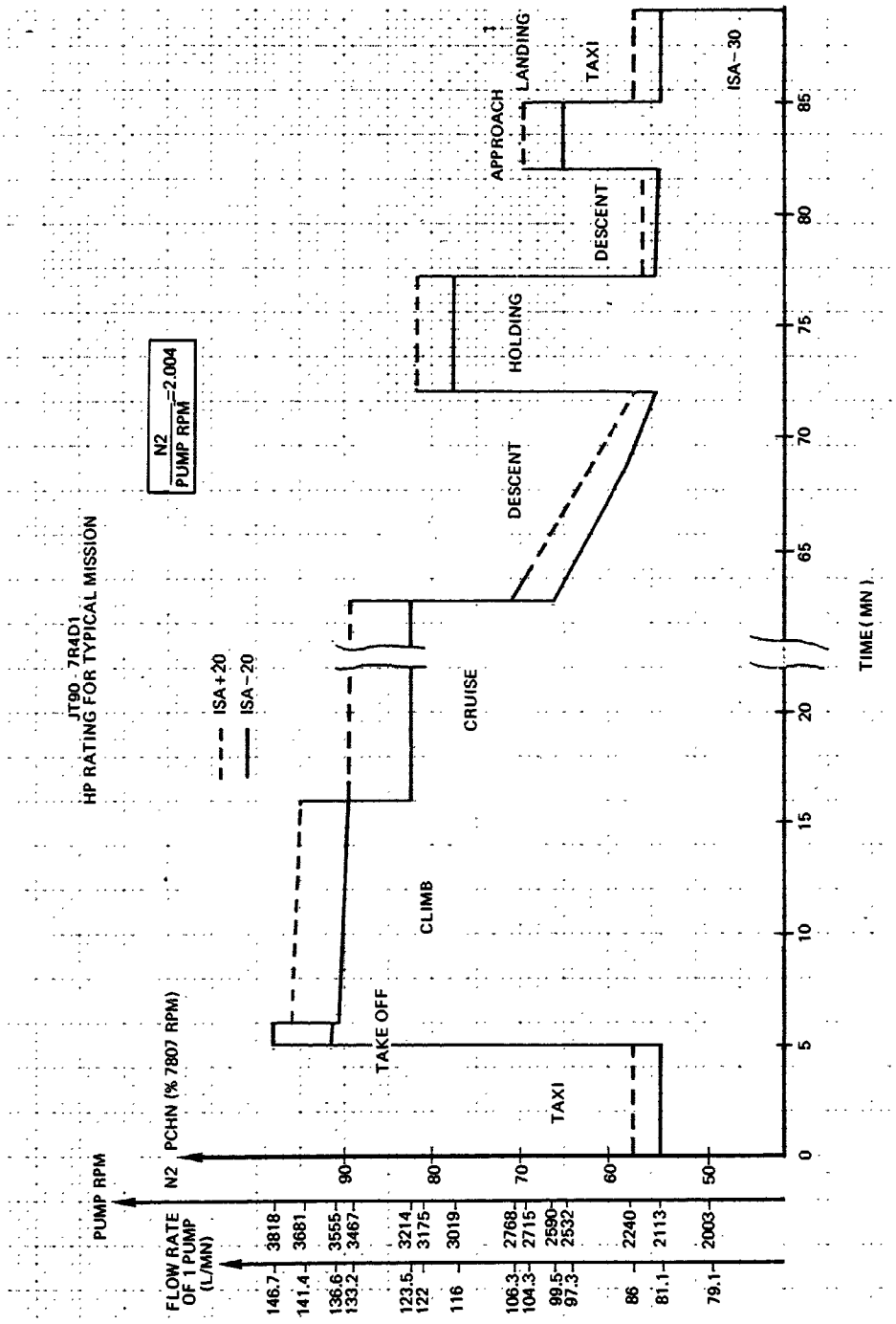
Green Engine Pumps Control and Monitoring
Figure 014

pumps.

- Suction
  Suction hoses are equipped at each end with a self-sealing coupling.
  NOTE : In the event of an engine fire, fire valves located in the wing shut off the supply of fluid in the suction lines. Pump operating time before degradation is then limited to 5 minutes.
- Delivery
  A spherical pulsation dampener is mounted at the pump end, a check valve at the pylon structure, and a pressure switch between the two. The pressure switch is set to operate at 125 bars (1810 psi) when pressure is decreasing.
- Case drain
  The case drain hose recovers pump internal leakage. It includes a 15 µ (0.0006 in.) absolute filter in the middle and a check valve at the pylon structure.



Hydraulic Pump Connections
Figure 015



BM5 29 11 00 0 DGMO

Pump Flow Rate Versus Engine RPM (PW)
Figure 016

6. Manifolds
(Ref. Fig. 010)
Component location..... 29.11, 29.12 and 29.13 (Ref. Fig. 010)

A. Servo Controls Manifolds :
. The servo controls manifolds each receive pressure, through a filter and a check valve, from the engine pumps and the ground connectors (and the RAT in the case of the Yellow system).
. They deliver pressure to the HP manifolds except when the power source is either the Green system electric pumps only, or one power transfer unit (Green/Blue or Green/Yellow), in which case the opposite occurs.
. They deliver pressure to the flight controls sub-systems through an electrohydraulic servo controls selector valve, downstream of which is a pressure switch and a sampling valve.

B. HP Manifolds :
The HP manifolds receive pressure :
. Directly from the servo controls manifold
. From the electric pumps or power transfer units, through a filter and a check valve.
They distribute pressure :
- Directly to the servo controls manifold.
- To the motors and selector valves of the landing gear, flaps and slats.
- To the standby generator manifold installed upstream of the flap motor. These are large power consumers and pressure is delivered to them through a priority valve which isolates them in the event of low pressure conditions.
- To the power transfer unit motors and to the normal braking system. These are isolated by the associated selector valves when not operating (Green system only).
In addition to the priority valve, they include :
- A pressure transmitter
- Two pressure switches set to operate at 100 ± 5 bars (1450 ± 72.5 psi) when pressure is decreasing.
- A pump delivery relief valve with manual depressurization feature.
Characteristics specific to the Yellow system manifold are described in section 29-13.

C. Return Manifolds
The return manifolds receive return fluid separately from the user services and case drains through check valves (except in the case of the servo controls to allow interconnection of the servo control chambers in the event of loss of pressure in the associated system).
Fluid is returned to the reservoir through the return filter, located near the reservoir.
The return manifolds are located near the HP manifolds (only the Yellow system manifolds are located away from the reservoir).

7. Power accumulators (Ref. Fig. 017)

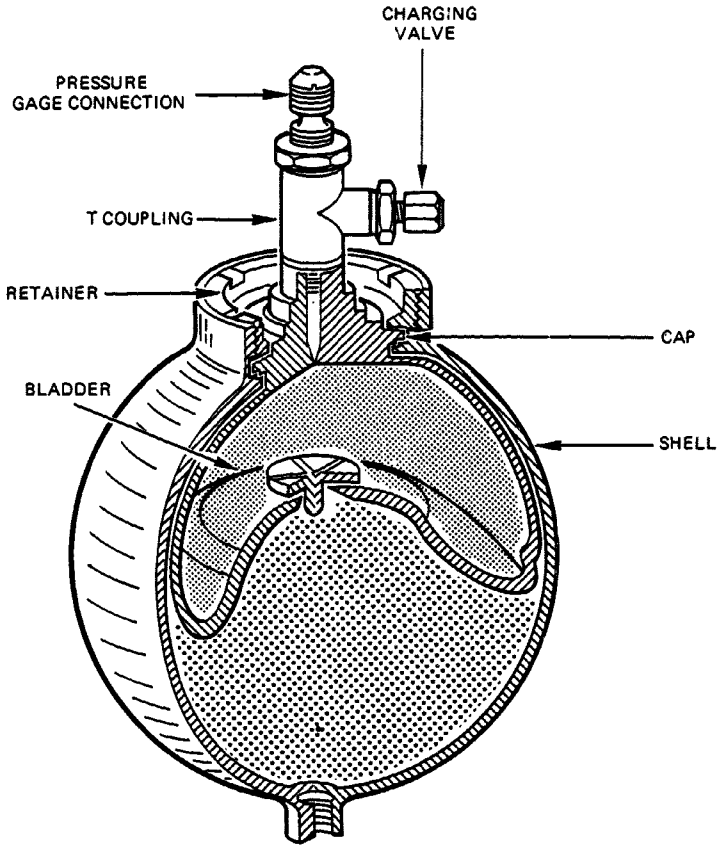
The power accumulators on the HP manifold in each system dampen pump delivery pulsations and any pressure surges, and compensate for pump response time in the event of high output demand.

They are spherical, bladder type accumulators, with a charging pressure of 100 bars (1450 psi) at 20° C (68° F). 144 bars (1665 psi) at 60°C, 90 bars (1305 psi) at -10°C (14°F) and 86 bars (1247 psi) at -20°C (4°F). Charging of each accumulator is achieved via an air charging valve, connected to a direct-reading pressure gage.

The minimum volume of fluid which can be liberated between 206 bars (3000 psi) (hydraulic system nominal pressure) and 135 bars is 250 cm³ (15.2 cu.in.) throughout the temperature range + 20° C to 110° C (+ 68° F to + 230° F).

The power accumulators are secured to mounts attached to the structure The quick-release fastening system includes a safety device protecting the accumulator against vibrations.

The accumulators are installed in such a way that any accidental burst would not cause damage to more than two systems at a time.



BM5 29 11 00 0 DLMO

Accumulator
Figure 017

8. Valves (Ref. Fig. 018, 019)

A. Fire Valves : 2 Green - 1 Blue - 1 Yellow
- The fire valves isolate engine pump suction in the event of engine fire.
- They are located in the wing, near the firewall.
- They each consist of a plug valve actuated by a 115 V, 400 Hz quarter-turn electric actuator. (Ref. Fig. 018)
- The valve opens or closes in 1.8 s maximum.
- They are controlled from the flight compartment by two ENG FIRE handles on the overhead panel. Four annunciators on the lateral panel indicate the position of the valves. (Ref. Fig. 019)
- The Yellow system fire valve is also controlled in the closing direction when low level (5 l) (1.32 US Gal) is sensed in Yellow system reservoir Ref. 29-13 and 29-31

B. Relief Valves (with manual depressurization feature in some cases). (Ref. Fig. 020)

(1)High output relief valves with manual depressurization facility for use on the ground - one on each HP manifold, returning fluid directly to the reservoir.
If a pump jams in high output configuration, the restriction of the flow rate of fluid that occurs as it passes through the valve causes rapid overheat and a temperature warning in the flight compartment.
Setting : Opening 234-238 bars (3393-3452 psi)
Closing 220 bars (3191 psi) min.
Pressure drop through high output relief valve should not exceed 15 bars (217 psi) for a max. flow rate of 140 l/mn (37 US Gal).

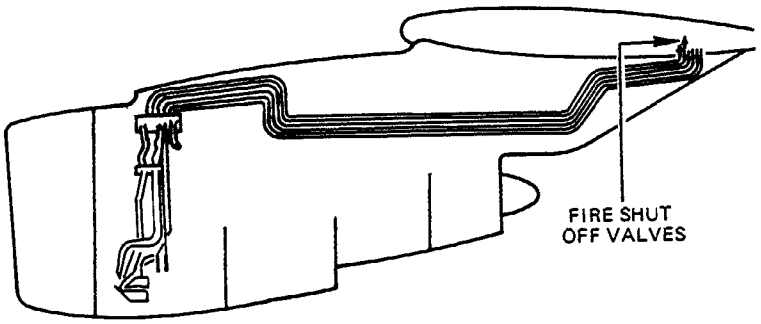
(2)Thermal relief valve with manual depressurization facility for use on the ground - on the braking section of the Yellow system HP manifold. It returns fluid directly to the reservoir, e.g. in the event of brake accumulator overheat.
Setting : Opening 234-238 bars (3393-3452 psi)
Closing 220 bars (3191 psi) min

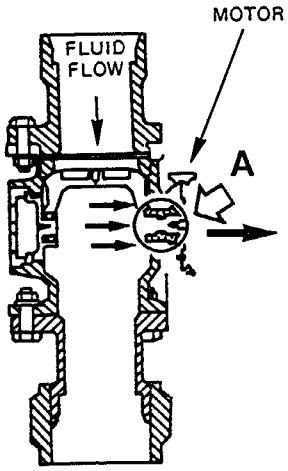
(3)Relief valve on cargo compartment door pressure supply line.
Setting : Opening 231-238 bars (3350-3452 psi)
Closing 220 bars (3191 psi)

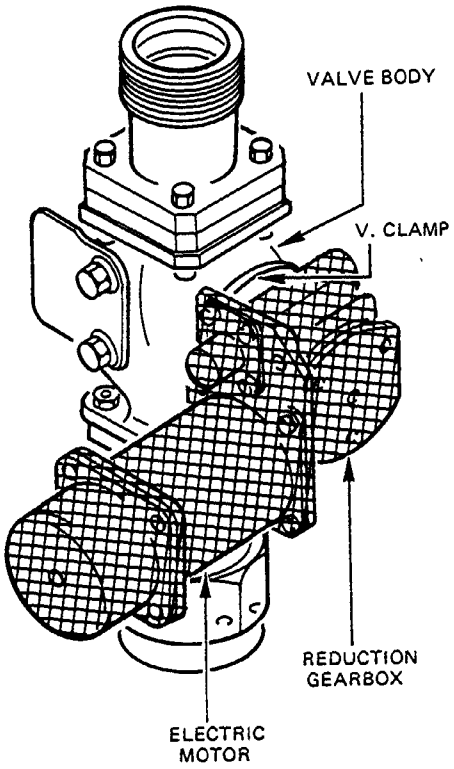
(4)Thermal relief valves on cargo compartment door actuating lines (4 : opening and closing of each door).
Setting : Opening 258-265 bars (3742-3843 psi)
Closing 240 bars (3480 psi)

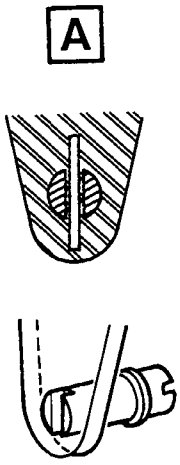
(5)Reservoir depressurization/relief valves - 1 on each ground service panel.
Setting : Opening 4.2 + 0.3 - 0.2 bars (60.9 + 4.35 - 2.90 psi)
Closing 3.7 + 0.1 - 0.1 bars (53.6 + 1.45 - 1.45 psi)

C. Priority Valves
Priority valves are mounted on the HP manifolds to cut off power supply to heavy power users: landing gear, flaps and slats, in the event of low pressure (hydraulic pumps saturated), thus ensuring priority to the servo controls. A fourth valve isolates the Yellow hydraulic motor in the trimmable horizontal stabilizer actuator.



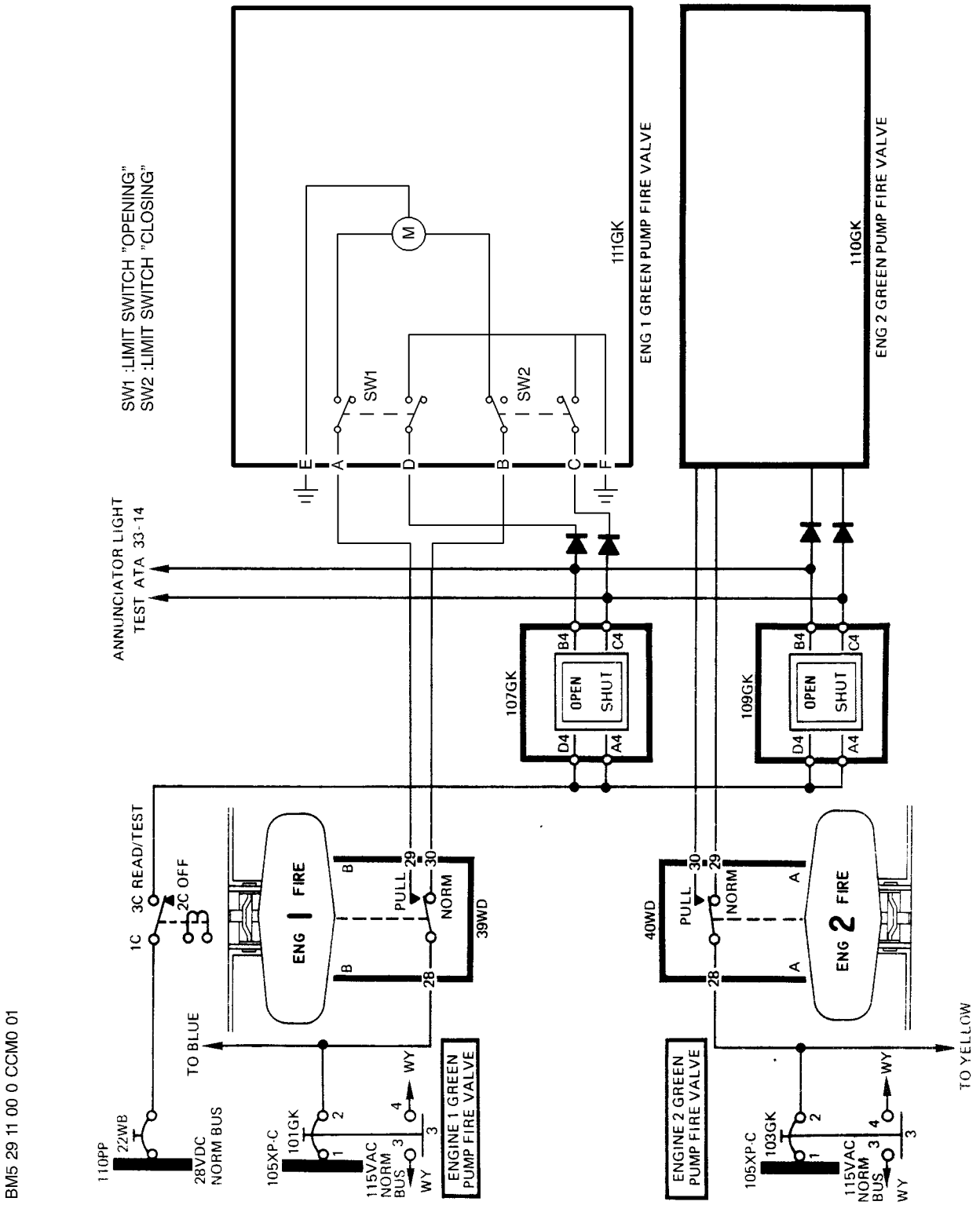






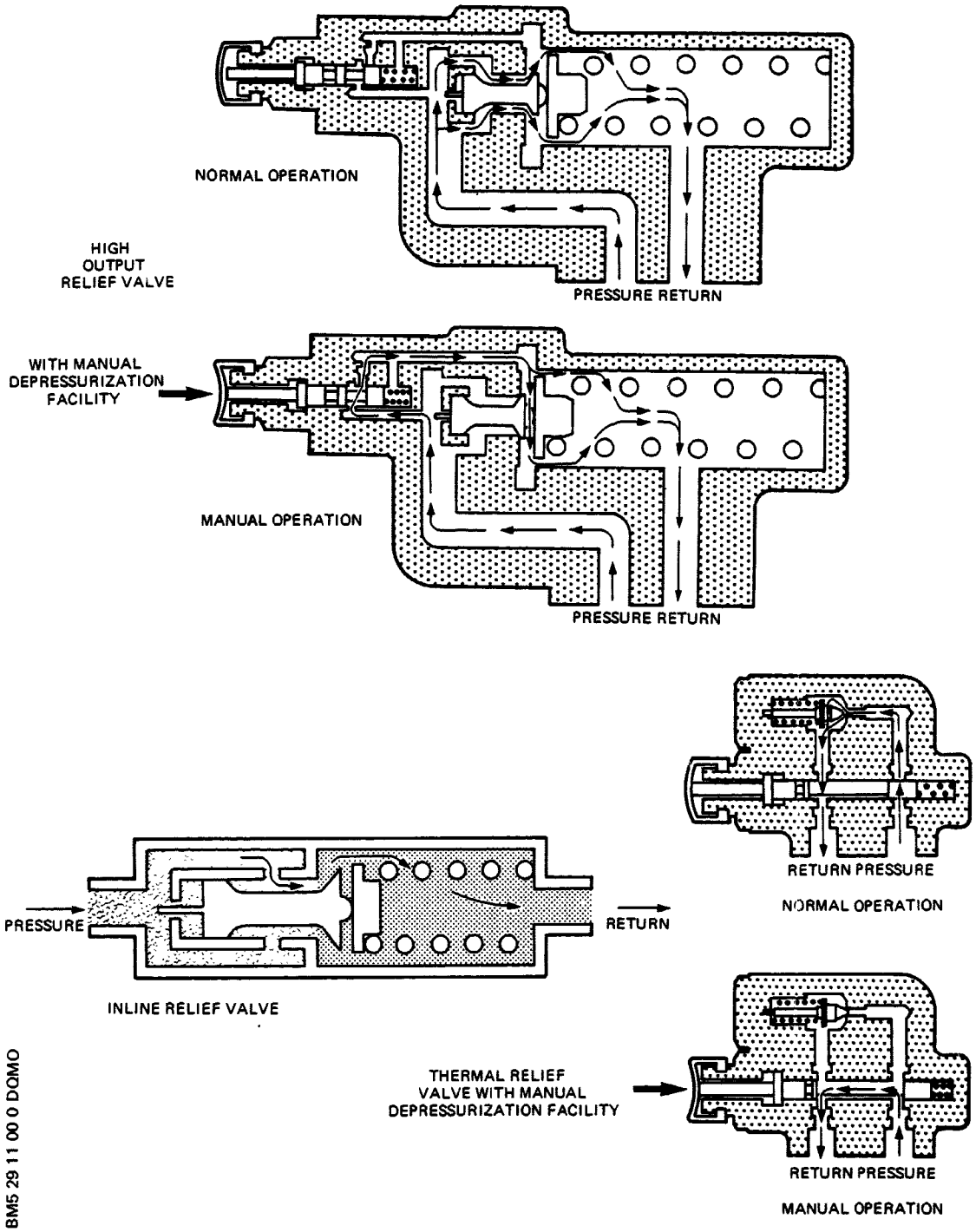
BM5 29 11 00 0 DNMO

Fire Valve
Figure 018



BM5 29 11 00 0 CCM0 01

Green Pump Fire Valves Control
Figure 019



Relief Valve, Functional Diagram
Figure 020

Setting : Close when pressure downstream of the valves is 130 bars (1885 psi). Max. flow rate at 165 bars (2393 psi) max relative pressure.

D. Safety Valves

Safety valves isolate certain sections of lines in the event of excessive fluid flow due to a rupture on :

- Each normal and standby supply line of each brake.
- The rudder Green servo control.
- Krueger flap and droop actuator power supply line (Green system).

E. Selector Valves : Electric - Hydraulic - Manual

Isolate and control each user or group of users, and include :

Servo controls	: three electrohydraulic selector valves : Green, Blue, Yellow, on the servo controls manifold, (open : solenoid de-energized)
Slats	: two solenoid valves : Green, Blue, on power control unit motors.
Flaps	: two solenoid valves : Green, Yellow, on power control unit motors.
Krueger flap and droop actuators	: one green selector solenoid valve near Green system servo controls manifold.
Landing gear	
Ext/Ret	: one Green selector valve in the center of the landing gear well ceiling
Nosewheel steering	: one Green selector valve in the nose gear well
Normal braking	: one Green selector valve on the HP manifold
Normal/alternate braking	: One brake automatic selector in the landing gear well aft center ceiling
Parking	: one Yellow parking brake selector in the nose gear well
Cargo compartment doors	: Two selector valves on the HP manifold plus Two manually operated control valves at the doors.
Power transfer units	: Two solenoid controlled flow shut off valves on the Green system driven motors.
Standby generator	: one standby generator selector valve.

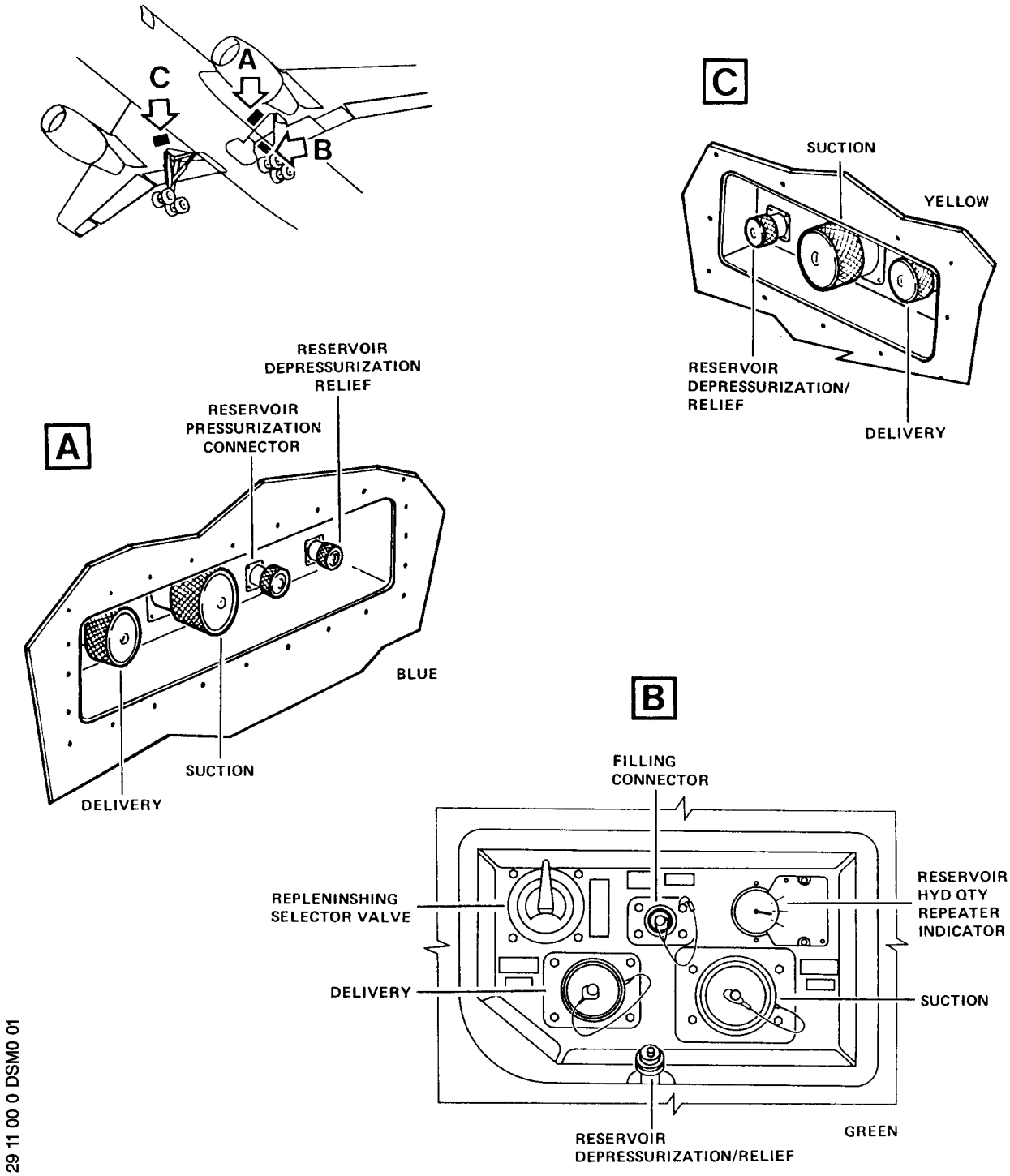
F. Check Valves

Check valves are placed wherever required to protect or isolate certain items, in particular on the delivery line of each pump.
All check valves have end fittings of different dimensions at each end to prevent installation in the wrong direction.

G. Self-Sealing Connectors

Easily accessible self-sealing connectors are provided on each system for connection of a ground replenishing unit location.
(Ref. Fig. 021)

- in L wing :
  . 1 on Blue system suction line,
  . 1 on Blue system delivery line,
  . 1 for reservoir depressurization with built-in pressure-relief valve,



Hydraulic System Ground Service Panels
Figure 021

. 1 for Green, Blue and Yellow system reservoir pressurization
- in R wing :
. 1 on Yellow system suction line
. 1 on Yellow system delivery line
. 1 for reservoir depressurization with built-in pressure-relief valve
- in hydraulics compartment :
. 1 on Green system suction line,
. 1 on Green system delivery line,
. 1 for reservoir depressurization with built-in pressure-relief valve
. 1 for Green, Blue and Yellow reservoir filling.

H. Isolation Valve Blocks - Leakage Measurement
Measuring internal leakage on the ground makes it possible to check that total leakage in a system remains within limits in keeping with safety criteria. In particular, ram air turbine pump output imposes a maximum leakage rate compatible with the minimum acceptable speed for control surface actuation.
Leakage measurement also provides a means of checking component condition during maintenance operations, especially in the context of on-condition maintenance. The isolation valve blocks are located near the servo controls manifold on each system. They allow power to be supplied separately to the servo controls in :
the LH wing, the RH wing, the tail unit.
A flowmeter on the ground cart pressure line enables leakage to be measured in various portions of a given system, depending on which valves are open.

J. Sampling Valves
Sampling valves are installed on each pressure line downstream of the servo controls selector valve. They are used to take samples of hydraulic fluid for contamination monitoring.

9. Filters

A. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures - 12-12-00, P. Block 1	Hydraulic Fluids

B. Filters are used to maintain hydraulic fluid in a state of cleanliness compatible with use of numerous servovalves.
Fluid contamination is monitored by particle counts of samples taken at special sampling valves located downstream of the servo controls manifold.

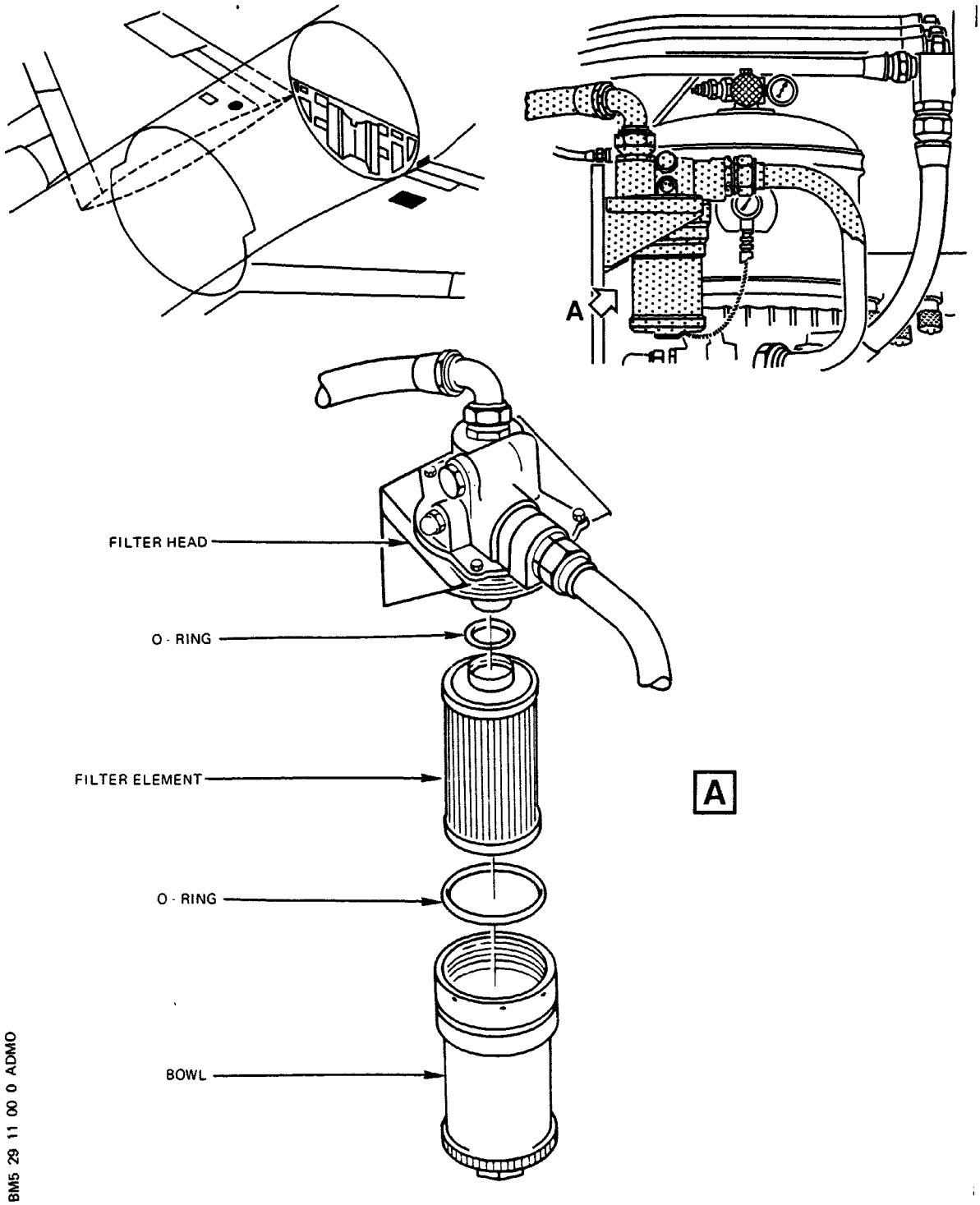
The maximum particle contamination must be lower than NSA307110 class 9 (Ref. 12-12-00, P. Block 1).

Type and location
Filter elements may be either cleanable or disposable.

C. HP Filters
1 on the main Blue system.
2 on the main Green system.
1 on the main Yellow system.
1 on the Green/Blue power transfer unit delivery line.
1 on the Green/Yellow power transfer unit delivery line.
1 on the Green system braking line.
1 in the reservoir filling system.
1 on the delivery line of the Green system electric pumps.
1 on the Yellow system electric pump delivery line.
These filters are of the non bypassing type, with a clogging indicator set to operate at 6 bars (87 psi) ± 10%.
Filtering capability is 3 to 15 μ (0.0001 in. to 0.0006 in.) absolute.
An automatic shutoff mechanism in the filters prevents any leakage and any fluid flow between the filter inlet and outlet when the bowl and filter element are removed, and prevents ingress of air into the system when the filter is installed. Filter elements may be either cleanable or disposable.

D. Return Line Filters : near the reservoir (Ref. Fig. 022)
One on each line comprising a 3 μ (0.0001 in.) absolute filter element (disposable type only), a clogging indicator (set to operate at 3 ± 0.5 bars) (43.8 ± 7.3 psi), bypass system (setting : 5 ± 0.5 bars) (73 ± 7.3 psi), and a dash-pot on clogging indicator supply line. The filters also have an automatic shutoff mechanism to facilitate removal.

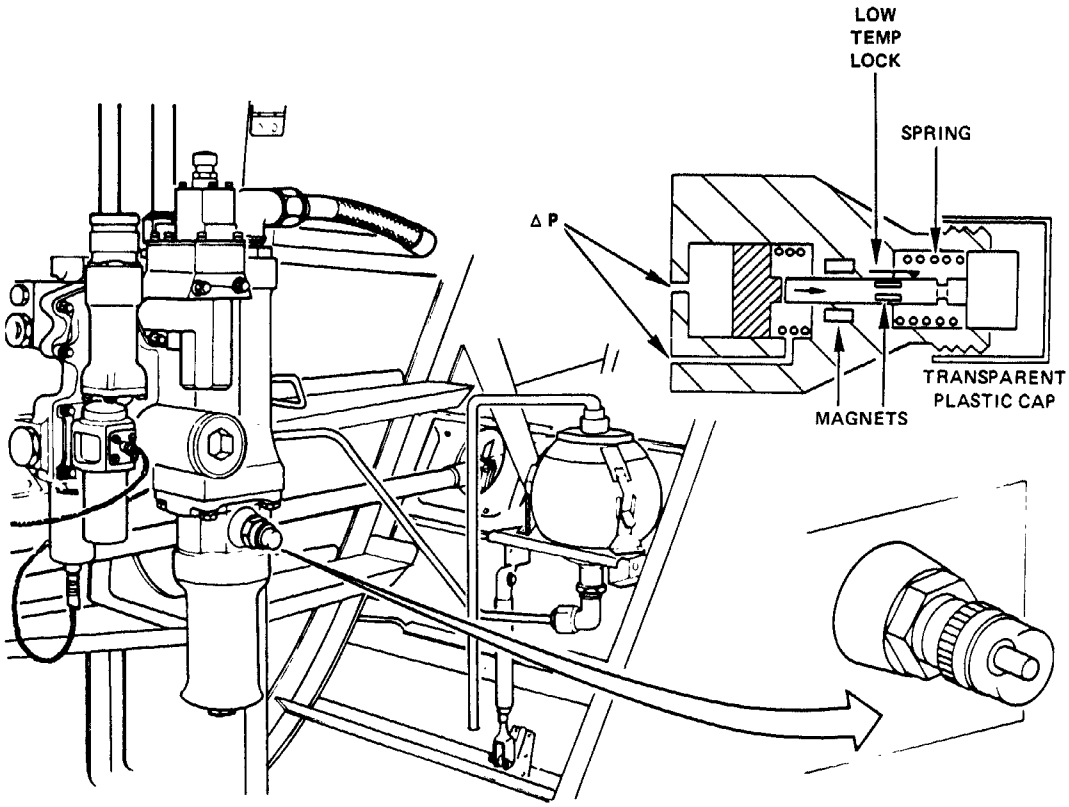
E. Case Drain Filters with a filtering capability of 15 μ (0.0006 in.) absolute, allow pump wear to be monitored by detection of metallic particles in the filter elements.
These filters also incorporate a clogging indicator, but there is no bypass (the indicator is set to operate at 8.3 bars/120 psi).



Filter Element Replacement
Figure 022

F. Clogging Indicator (Ref. Fig. 023)
When the filter is clogged, the increase in differential pressure causes the protrusion of a red colored button, visible through a transparent frame.
The filter element must be replaced as soon as possible.
The clogging indicator is reset by simply removing the transparent frame and pressing the indicator button.
In low temperature conditions, clogging indicator operation is inhibited (thermostatic locking at 0° ± 2°C (32.9 ± 3.6°F) with unlocking at 30°C (86°F).

G. Integral Protective Filters
- In addition to these main filters, the hydraulic systems also include protective filters integral with certain components, in particular the servovalve.



BM5 29 11 00 0 DUN0 – 01

Filter Clogging Indicator
Figure 023

10. Pressure Switches and Pressure Transmitters

A. The pressure switches are installed :
- 1 on the delivery line of each engine driven pump to activate a warning in the event of pump low pressure condition.
- Two restrictors (291702-291703) are installed in the pylons on the manifold pressure switch for the Green system only.
  During cruise, there is a low flow demand. Therefore, only one pump delivers the flow needed and the second pump is on standby (different pump setting).
  In order to avoid possible fluid overheating inside the pump which is on standby, the restrictor has been installed to authorize a minimum flow from the pressure line to the case drain and a subsequent flow in the engine driven pump.
- 1 on the common delivery line of the Green system electric pumps to indicate a pressure drop when these electric pumps are suplied with power.
- 1 on the HP manifold of each system to indicate a low pressure condition in the system.
- 1 on the servo control manifold of each system to indicate a low pressure condition.
- 1 in the ram air turbine pump delivery system, mounted on the ground checkout module.
- 1 on each reservoir to detect a low air pressure condition.

B. A pressure transmitter is mounted on the manifold of each one of the 3 systems.
The operating principle is based on a variable reluctance.

GREEN MAIN HYDRAULIC POWER - DESCRIPTION AND OPERATION

1. General

This system is the most important of the three.

- It includes one pump on each of the two engines.
- It actuates directly the majority of the user services except :
  . Twelve of the fourteen spoilers.
  . The flap and slat wing tip brakes (sub-system not affected by any wing tip damage).
  . The yaw damper.
  . The cargo compartment doors.
- It can operate independently on the ground by means of the APU and the electric pumps : 29-21.
- It is used to pressurize the other systems by means of the power transfer units :
  Green/Blue .....29-22.
  Green/Yellow .....29-23.
- In addition, the Green system ground service panel features controls and indicators for the reservoir filling system.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)
(Ref. Fig. 003)
(Ref. Fig. 004)
(Ref. Fig. 005)

(Ref. Fig. 006)

(Ref. Fig. 007)
R (Ref. Fig. 008)

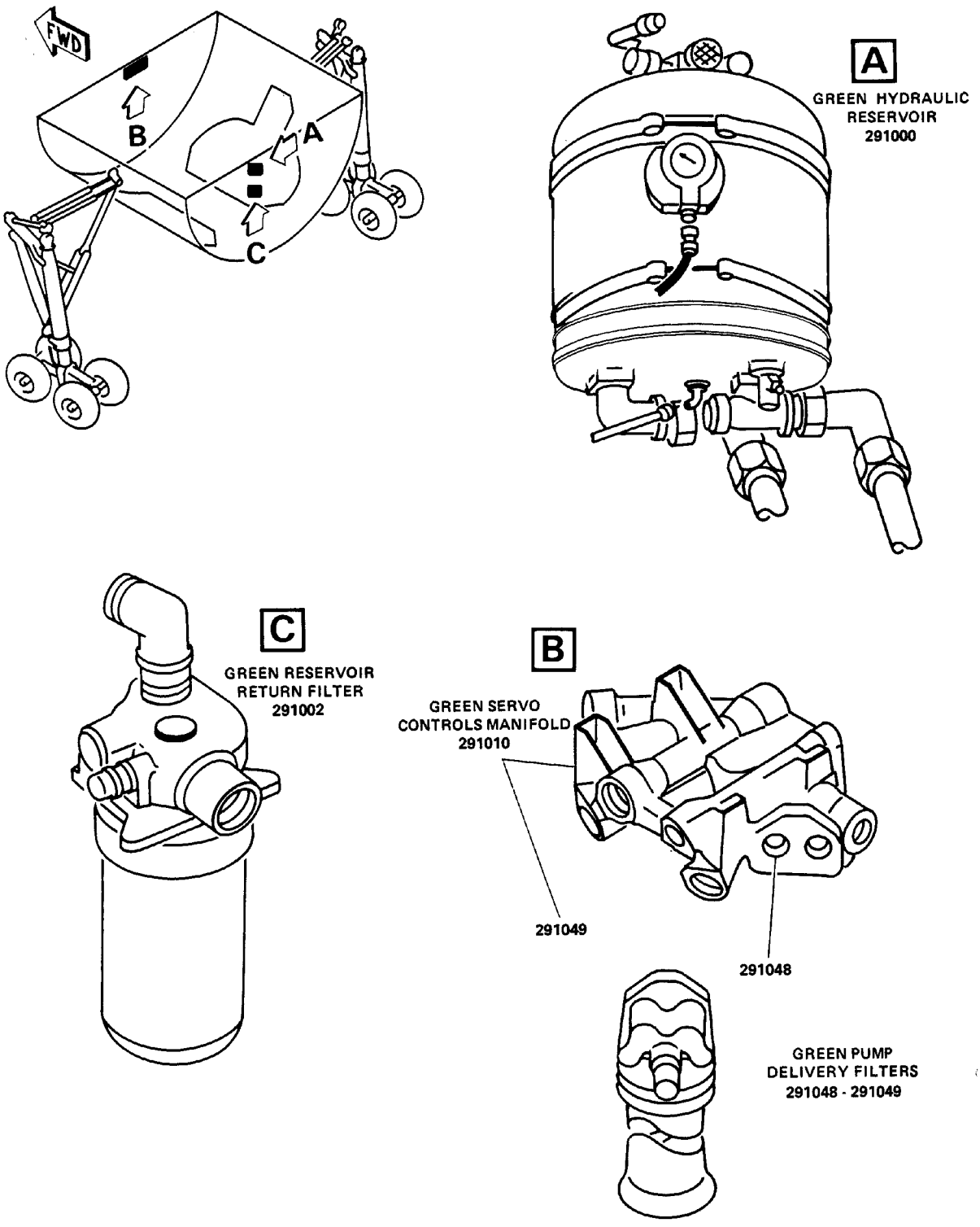
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
291000	RESERVOIR-HYDRAULIC, GREEN		147	734	29-11-11
291002	FILTER-RSVR RETURN, GREEN		147	734	29-11-15
291004	MANIFOLD-LP, GREEN		147	734	
291005	VALVE-DEPRESS RELIEF, G RSVR		147	147AL	
291006	GROUND CONNECTOR-SUCTION, G		147	147AL	
291007	GROUND CONNECTOR-FILLING, G		147	147AL	
291008	GROUND CONNECTOR-DELIVERY, G		147	147AL	
291010	MANIFOLD-SERVO CONTROLS, G		147	734	29-11-34
291030	PUMP-GREEN, ENG1		435	435AL	29-11-32
291031	PUMP-GREEN, ENG2		445	445AL	29-11-32

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	111GK	VALVE-ENGINE PUMP FIRE, ENG1		575	575AL	29-11-33
	110GK	VALVE-ENGINE PUMP FIRE, ENG2		675	675AL	29-11-33
R	291038	SELF-SEALING COUPLING HALF		410	435AL	29-11-67
R	291039	SELF-SEALING COUPLING HALF		420	445AL	29-11-67
R	291040	VALVE-NON RETURN		473	473AL	29-11-65
R	291041	VALVE-NON RETURN		473	473AL	29-11-65
R	291042	VALVE-NON RETURN		483	483AL	29-11-65
R	291043	VALVE-NON RETURN		483	483AL	29-11-65
	291048	FILTER-G PUMP DELIVERY, ENG1		147	734	29-11-42
	291049	FILTER-G PUMP DELIVERY, ENG2		147	734	29-11-42
	112GK	PRESS SWITCH-G PUMP, ENG2		483	483AL	29-11-62
	113GK	PRESS SWITCH-G PUMP, ENG1		473	473AL	29-11-62
R	291700	MANIFOLD-ENGINE PYLON		473	473AL	29-11-61
R	291701	MANIFOLD-ENGINE PYLON		483	483AL	29-11-61
R	291702	RESTRICTOR-GREEN PUMP RECIRCULATION, ENG1		473	473AL	29-11-61
R	291703	RESTRICTOR-GREEN PUMP RECIRCULATION, ENG2		483	483AL	29-11-61
	291060	MANIFOLD-HP, GREEN		147	734	29-11-12
	291063	RELIEF VALVE-GREEN PUMPS DELIVERY		147	734	29-11-55
	291064	PRIORITY VALVE-GREEN		147	734	27-14-14
	291070	ACCU-GREEN PWR		147	734	29-11-56
R	291071	AIR CHARGING VALVE		148	734	29-32-25
R	291072	PRESS GAGE-GREEN ACCU		148	734	29-32-21
	30WW	PRESS SWITCH-HP MANIFOLD, G		147	734	
		FILTERS-ENGINE-PUMP		435	435AL	29-11-36
		CASE DRAIN		445	445AL	29-11-36
	291015	CHECK VALVE-L/G RETURN, G		147	734	
	291019	CHECK VALVE-PTU RETURN, G		147	734	
	291020	CHECK VALVE-CASE DRAIN RETURN, G		147	734	
	291021	CHECK VALVE-FLAPS AND SLATS RETURN, G		147	734	
	291022	CHECK VALVE-RETURN, G HP MANIFOLD		147	734	
	291023	CHECK VALVE-L/G RETURN, G		147	734	
	291024	CHECK VALVE-BRK RETURN, G		147	734	
	291026	CHECK VALVE-RETURN, G/B PTU		147	734	
	291050	CHECK VALVE-G PUMP DELIVERY, ENG 1		147	734	
	291051	CHECK VALVE-G PUMP DELIVERY, ENG 2		147	734	
	291080	CHECK VALVE-G ELEC PUMP DELIVERY		147	734	
	291131	CHECK VALVE-G RSVR FILLING		147	734	
R	291139	LP RESTRICTOR VALVE		147	734	29-16-12

3. Users
(Ref. Fig. 009)

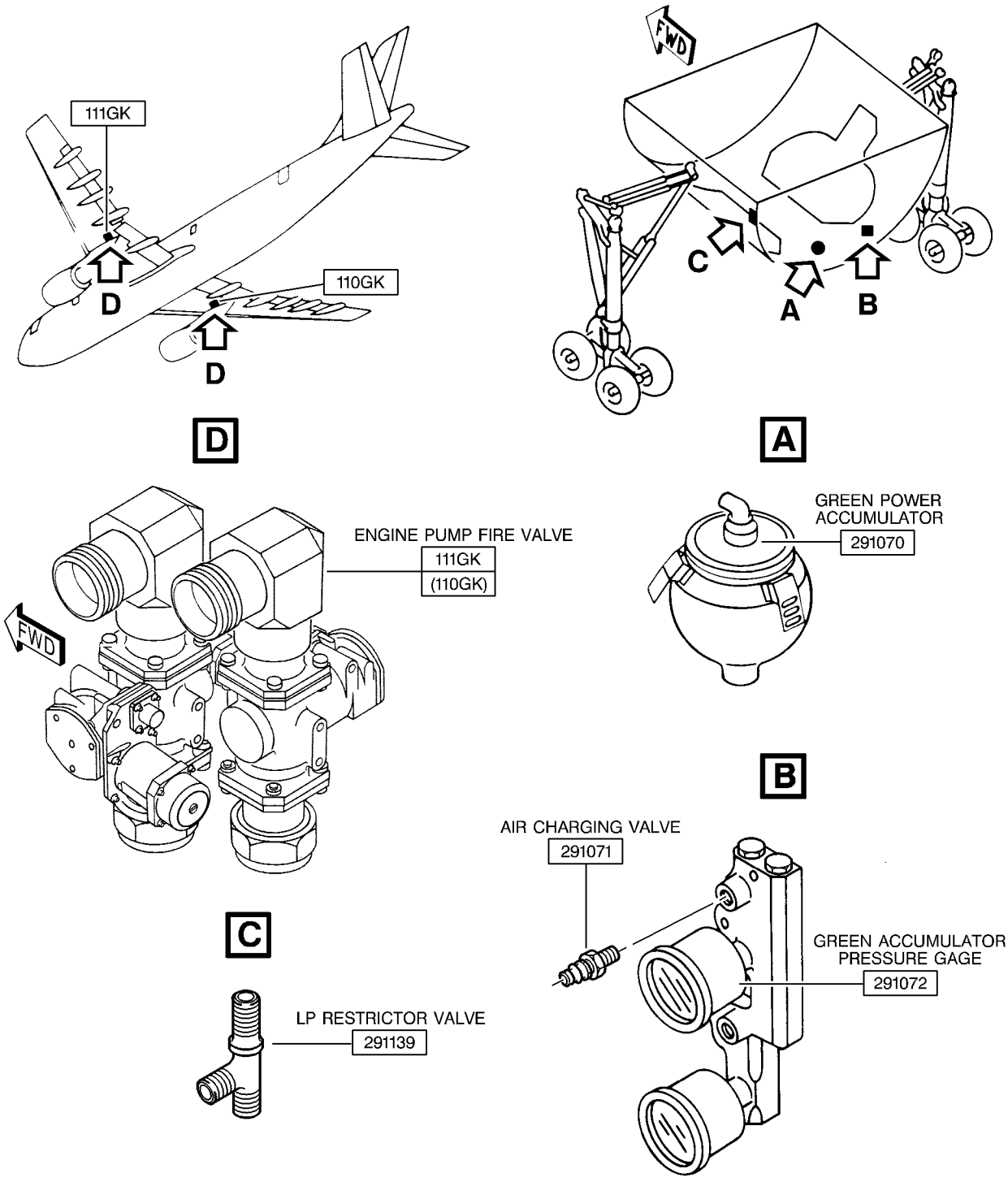
A. Supplied through the servo controls manifold, with independent supply capability on the ground
. of the L wing
R
. of the aft fuselage
. Two all speed aileron servo controls L and R ASA

Leakage measurement by means of isolation valves



BM5 29 11 00 0 DDM0 – 00

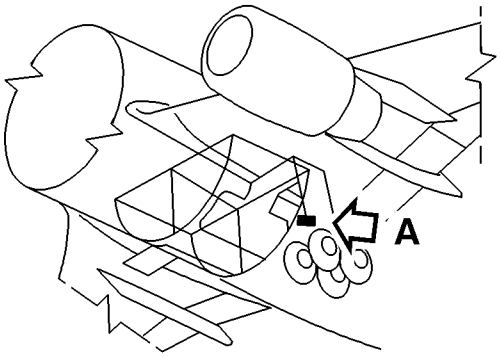
Component Location
Figure 001



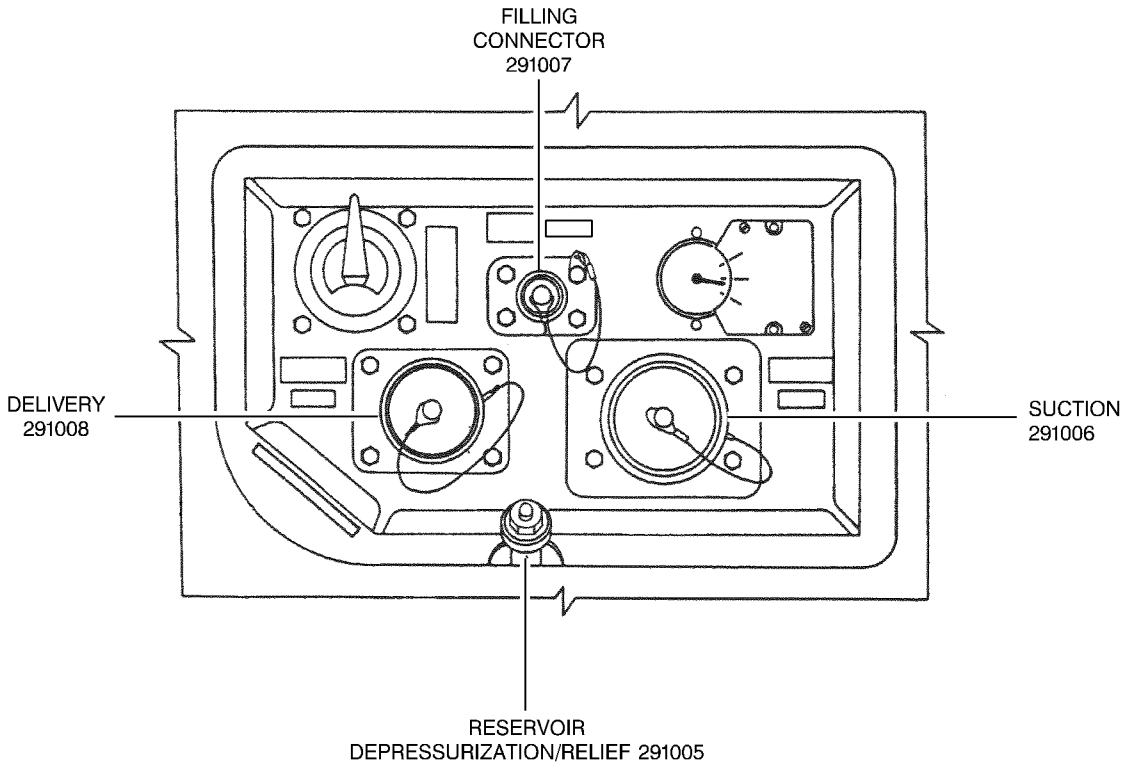
BM5 29 11 00 0 BBM0 01

R

Component Location
Figure 002



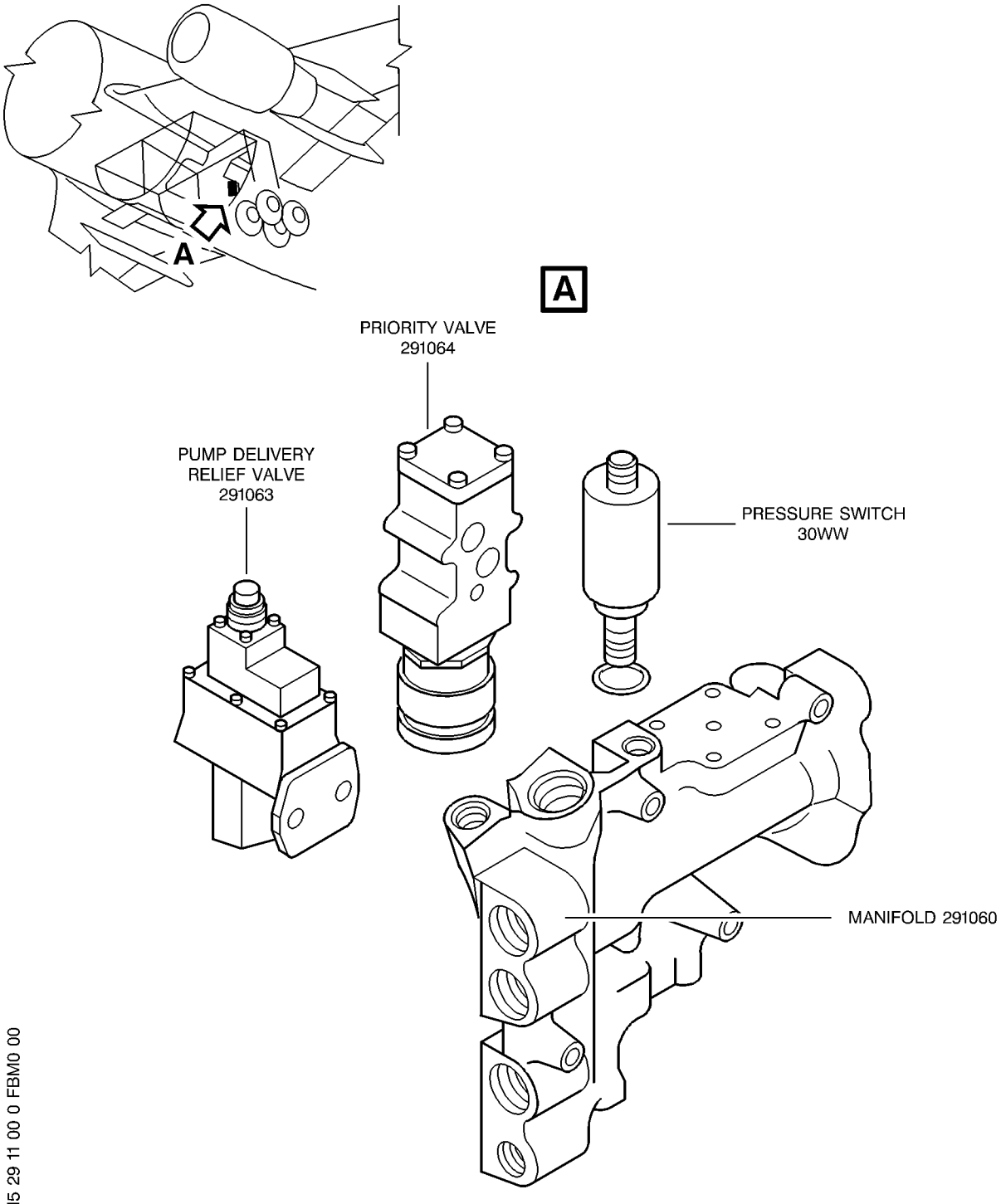
A



BM5 29 11 00 0 BYM0 01

R

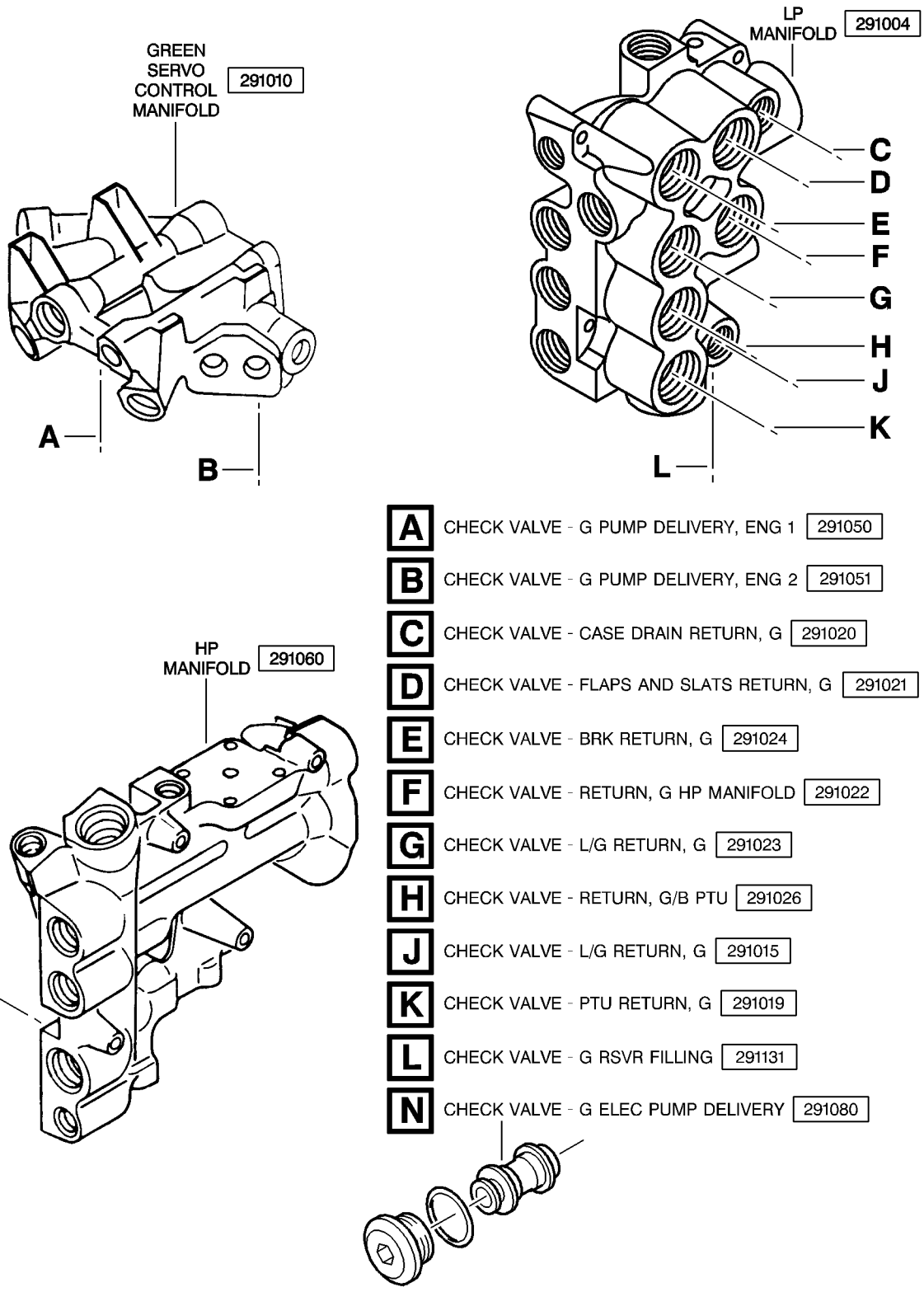
Component Location
Figure 003



BM5 29 11 00 0 FBM0 00

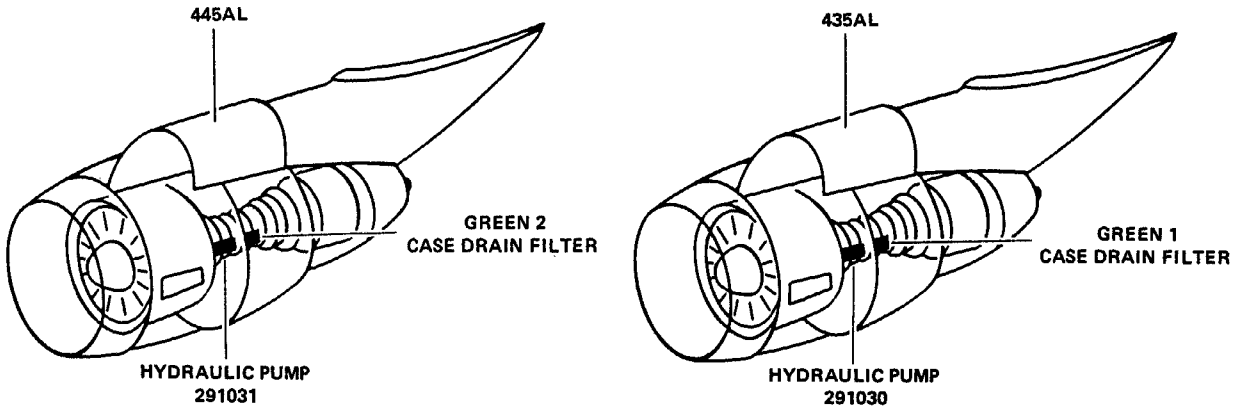
Component Location
Figure 004

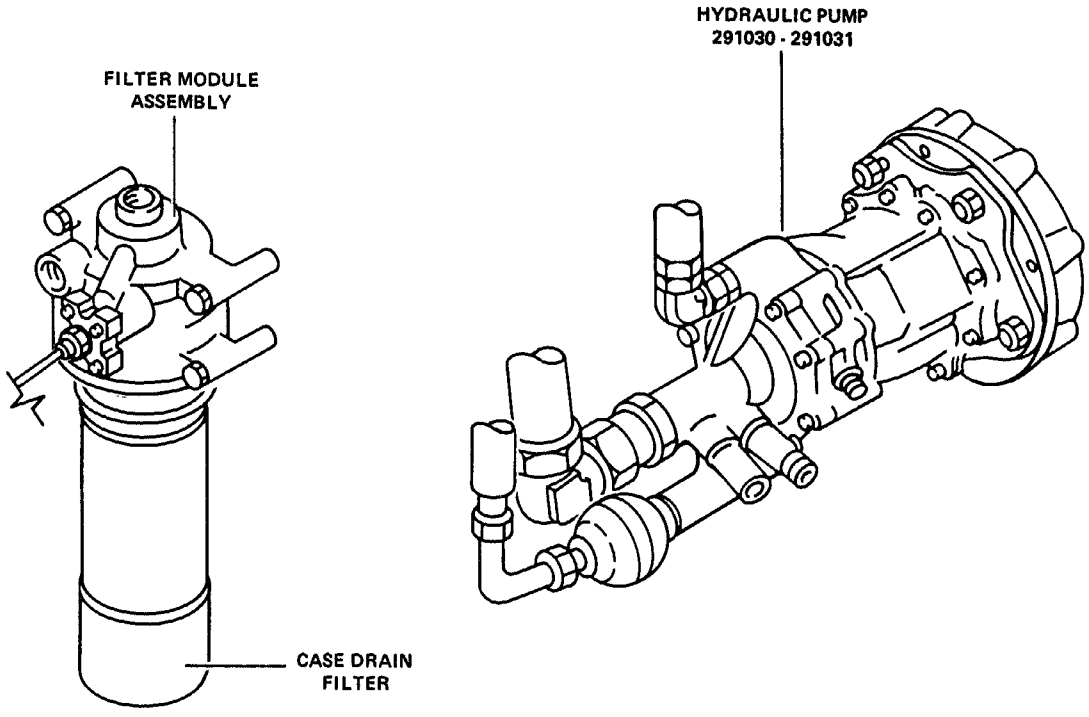
R


GREEN SERVO CONTROL MANIFOLD 291010
A
B
LP MANIFOLD 291004
C
D
E
F
G
H
J
K
L
HP MANIFOLD 291060
N
A CHECK VALVE - G PUMP DELIVERY, ENG 1 291050
B CHECK VALVE - G PUMP DELIVERY, ENG 2 291051
C CHECK VALVE - CASE DRAIN RETURN, G 291020
D CHECK VALVE - FLAPS AND SLATS RETURN, G 291021
E CHECK VALVE - BRK RETURN, G 291024
F CHECK VALVE - RETURN, G HP MANIFOLD 291022
G CHECK VALVE - L/G RETURN, G 291023
H CHECK VALVE - RETURN, G/B PTU 291026
J CHECK VALVE - L/G RETURN, G 291015
K CHECK VALVE - PTU RETURN, G 291019
L CHECK VALVE - G RSVR FILLING 291131
N CHECK VALVE - G ELEC PUMP DELIVERY 291080

BM5 29 11 00 0 DRM0 01

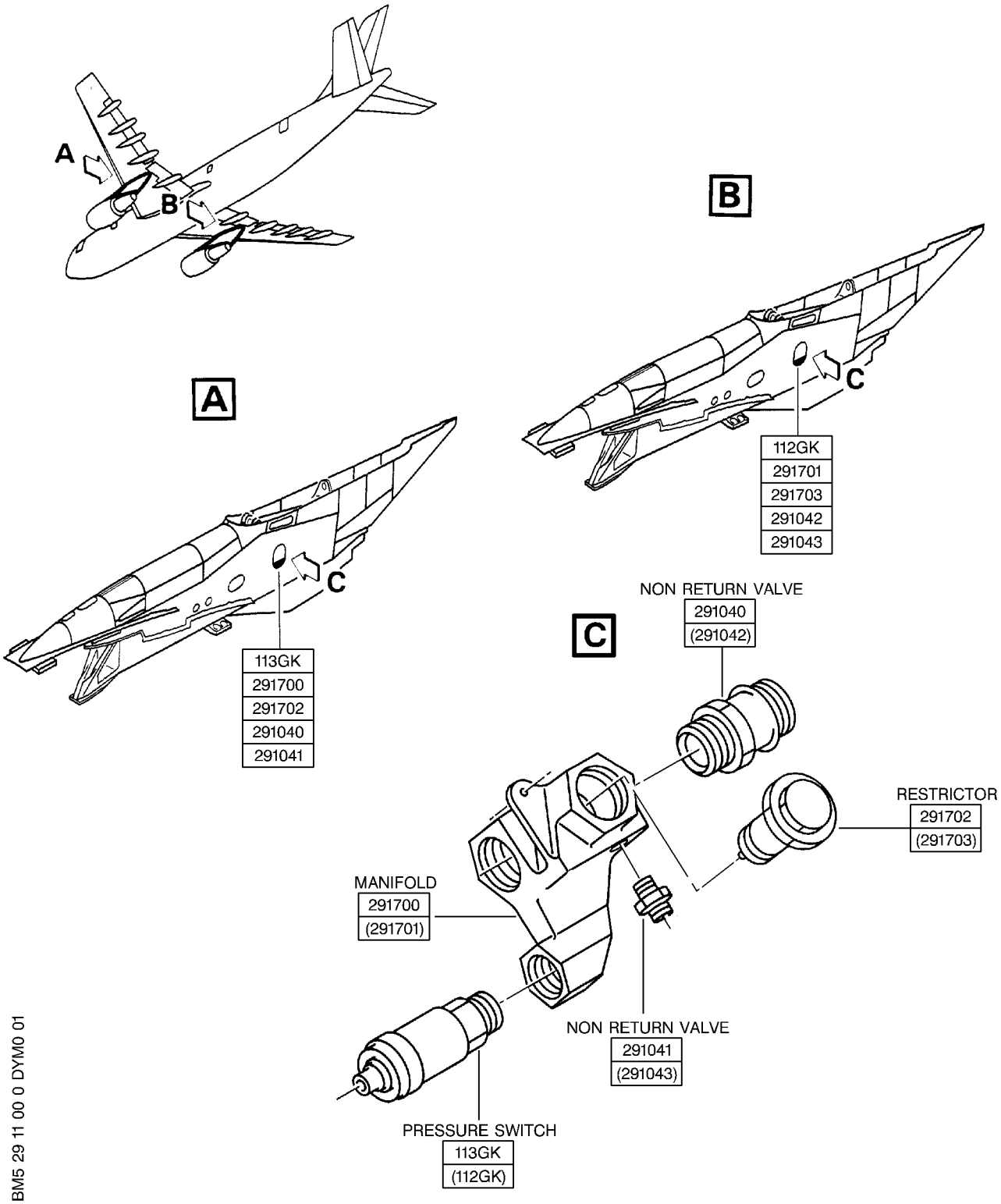
Component Location
Figure 005





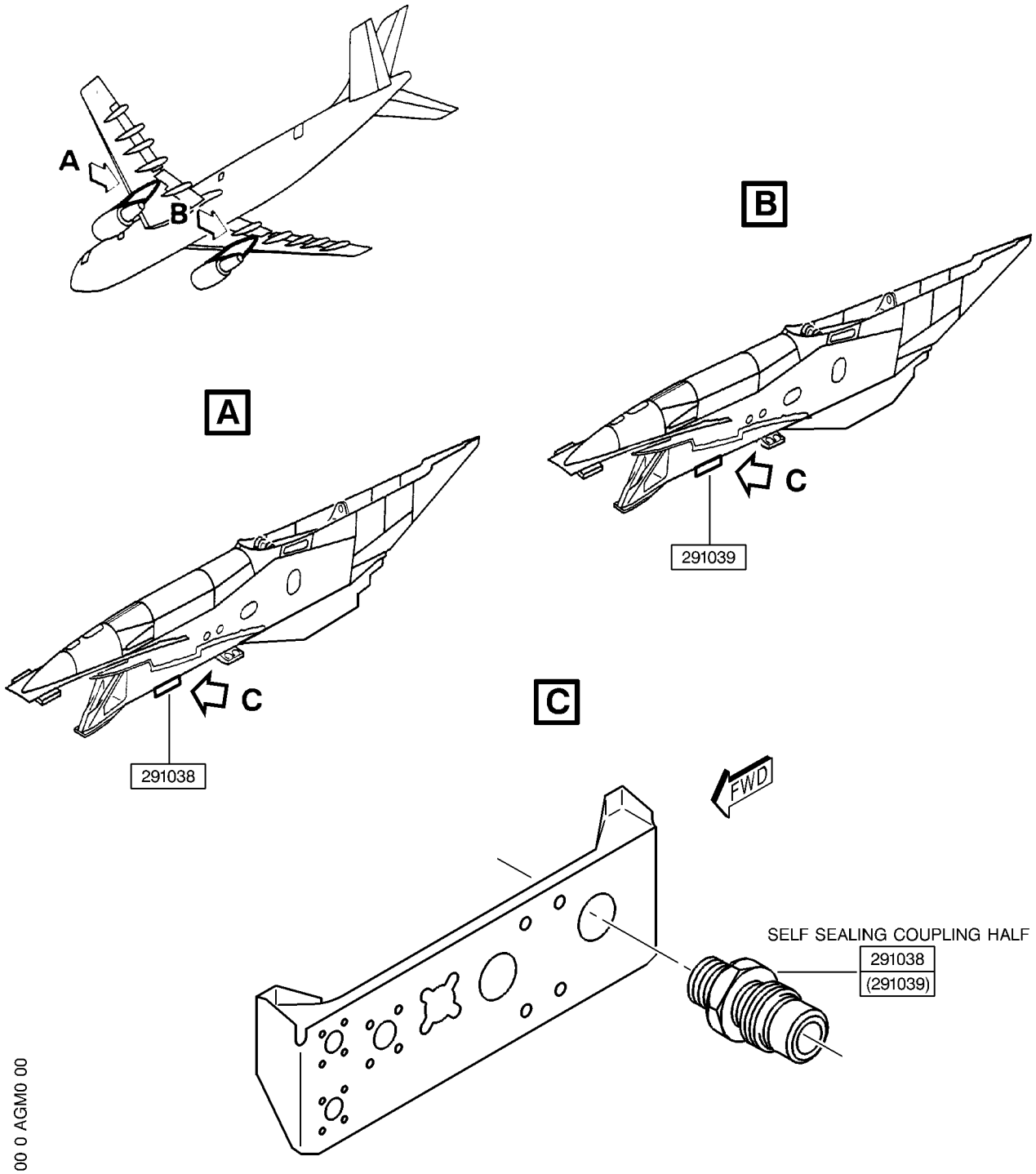
BM5 29 11 00 0 GAM0 – 21

Component Location
Figure 006



Component Location
Figure 007

R



BM5 29 11 00 0 AGM0 00

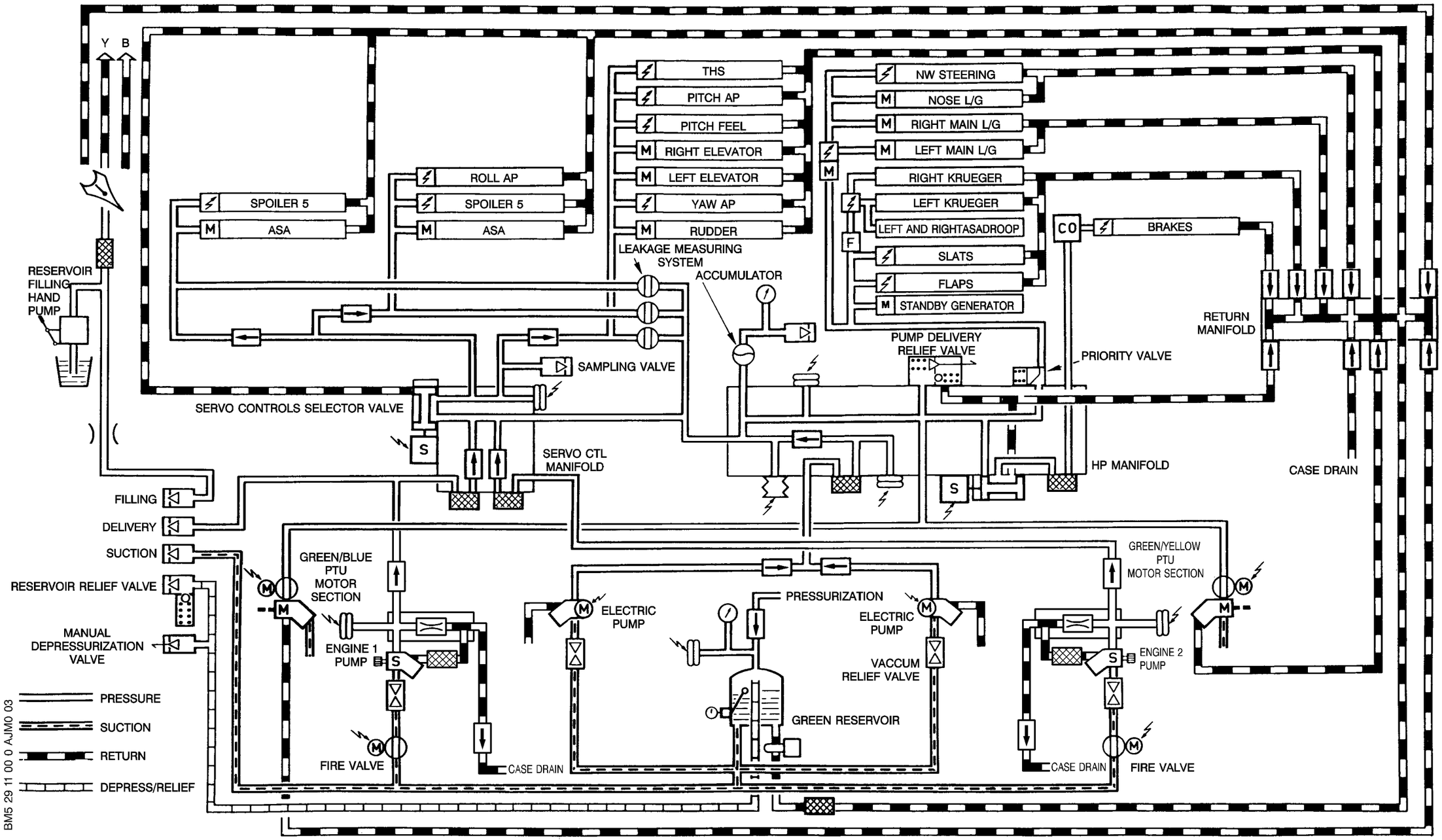
Component Location
Figure 008

R

R EFFECTIVITY: 001-100,

PIA

Printed in France



Green Hydraulic Power System
Figure 009

R

. Two elevator servo controls L and R
. One rudder servo control
. Two actuators on spoilers 5, L and R 5th outboard from the fuselage.
. One trimmable horizontal stabilizer actuator motor THS
. One autopilot roll actuator servomotor
. One autopilot pitch actuator servomotor
. One autopilot yaw actuator servomotor
. One pitch artificial feel actuator.

B. Supplied through the HP manifold
. Two hydraulic motors of the Green/Blue and Green/Yellow power transfer units.
. The normal braking system for the eight main landing gear wheels.
And through a priority valve :
. Two hydraulic motors in the flap and slat power control units.
. Two Krueger flap actuators.
. Two droop actuators
. Landing gear extension/retraction and nose wheel steering systems
i.e : three landing gear actuating cylinders
three downlock systems
four landing gear door actuating cylinders
seven landing gear and landing gear door uplocks with uplock release actuators
two nose wheel steering actuating cylinders powered in parallel with the landing gear extension system.
Standby generator..... 24-24.

4. Reservoirs
(Ref. Fig. 010)
(Ref. Fig. 011)

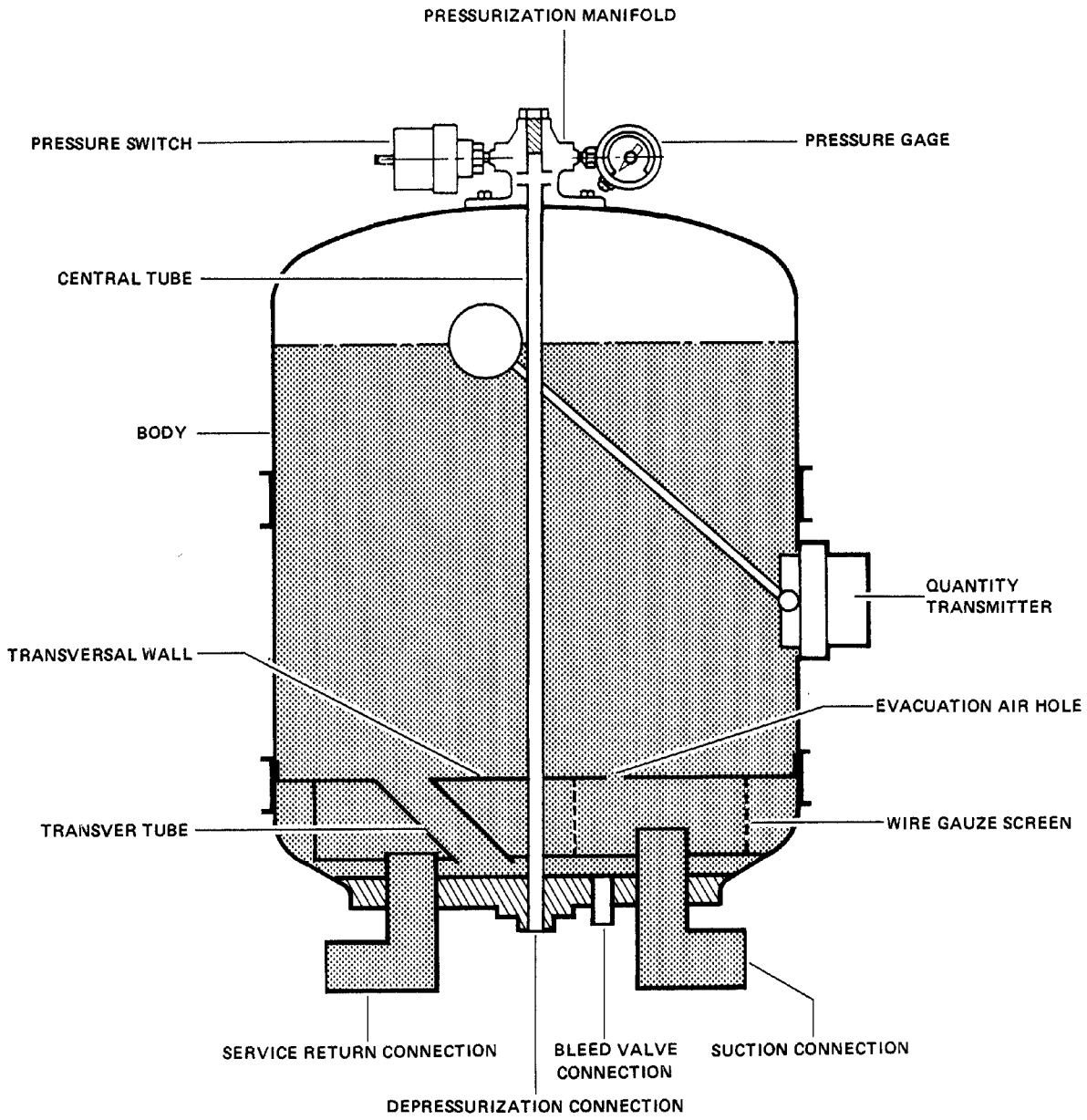
A. Purpose
. Each hydraulic system includes a reservoir which compensates for variations in fluid volume due to user service operation, and provides a reserve supply of fluid.
Reservoir volume included ; the volume of fluid in each system is approximately 170 l (44.8 US Gal) for Green system, 85 l (21.14 US Gal) for Blue system and 120 l (31.6 Us Gal) for Yellow system.
. The three reservoirs are air-pressurized to 3.5 bars (50.8 psi).
. Each reservoir is designed to remains pressurized for at least 12 hours.

B. Description
. The reservoirs are attached to the aircraft structure by two clamp-secured straps. They each consist of a sheet steel cylinder with a molded light alloy base. Cylinder diameter is the same for each reservoir. Their relative capacities are therefore determined by their height.

	Green	Blue	Yellow
Total	40 l (10.57 USgal)	22 l (5.81 USgal)	28 l (7.4 USgal) ±3 l (0.79 USgal) (reserve)
Max gageable	30 l (7.93 USgal)	17 l (4.49 USgal)	24 l (6.34 USgal)
Fill level	17 l (4.49 USgal)	12 l (3.17 USgal)	18.5 l (4.89 (USgal)
Low level warning	5 l ±0.5 (1.32 USgal ±.13)	5 l ±0.5 (1.32 USgal ±.13)	

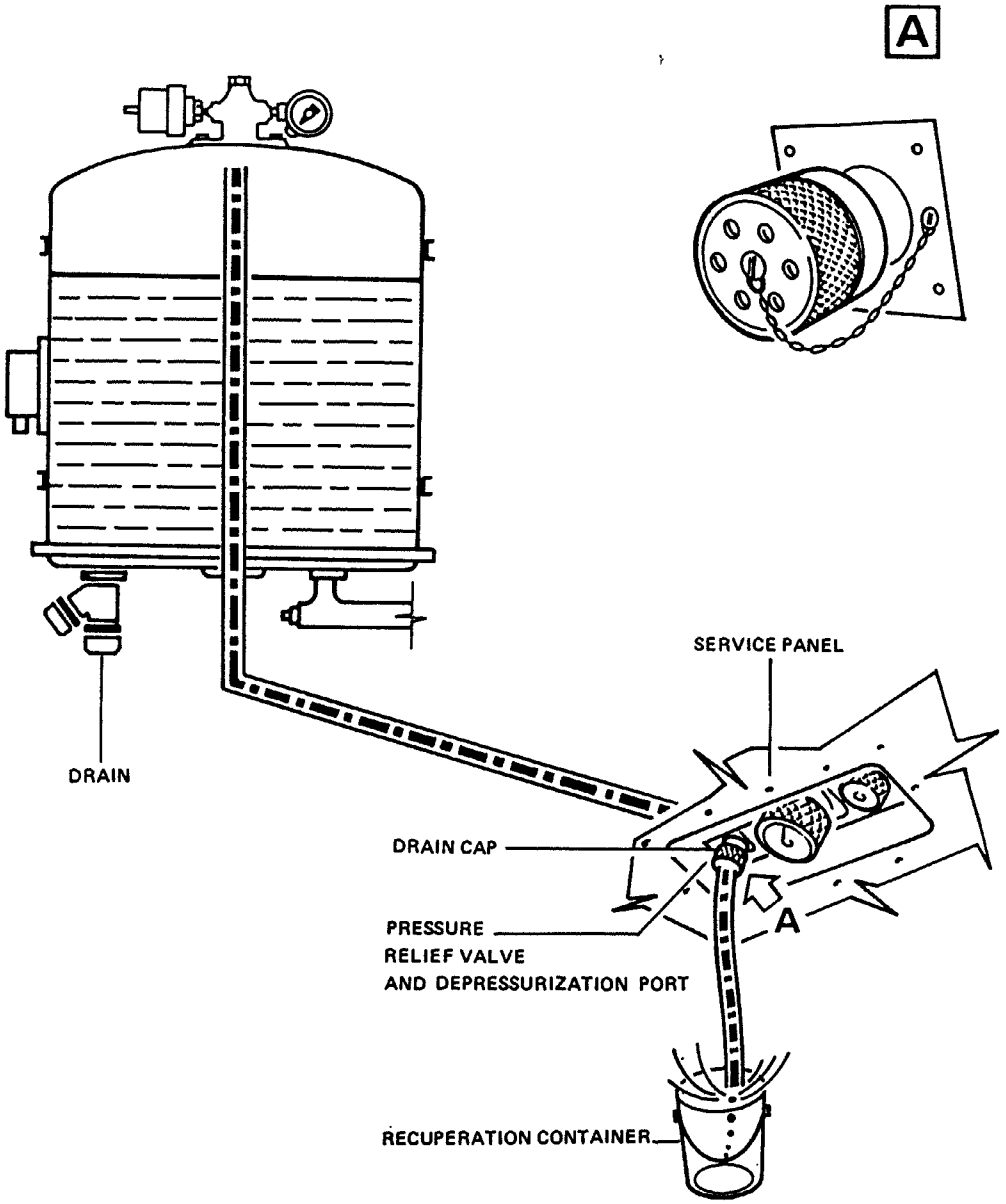
The level of the three reservoirs may be adjusted separately at the Green system ground service panel.
The yellow reservoir includes a reserve for RAT supply
- Air-fluid contact is direct.
- A compartment feature ensures positive fluid supply to the pumps during negative "g"" conditions of up to 20 seconds.
- An internal device limits emulsion in the event of substantial return flow.

C. Accessory Components
. The top of each reservoir is equipped with a pressurization manifold, including :
. A check valve on the air supply line.
. A direct reading air pressure gage (Accuracy ± 2° of angle)
. An air pressure switch which signals low pressure conditions to the flight compartment.
(Ref. 29-34)
Midway down the reservoir is mounted a quantity transmitter comprising :
. A float, with actuating linkage and snubber.
. A direct reading quantity gage.
. An electrical connector for transmitting quantity signals and low level warnings to the flight compartment and to the Green system ground service panel.
(Ref. 29-31)



BM5 29 11 00 0 DBM0 – 00

Green Reservoir Schematic
Figure 010



BM5 29 11 00 0 DCMO - 11

Reservoir Depressurization
Figure 011

The bottom of the reservoir includes :
. A suction port for supply of fluid to the pumps (± one for the ram air turbine on the Yellow system reservoir).
. A return port with an overheat sensor.
(Ref. 29-33)
. A port connected to a self-sealing depressurization/relief valve in the ground service panel. (Ref. Fig. 011)
. A drain valve.

D. Component Operating Settings
- Air pressure switch :
1.5 ± 0.1 bars (21.75 ± 1.45 psi) - pressure decreasing
1.7 bars (24.65 psi) maximum - pressure increasing.
- Depressurization/relief valve
(4.2 ± 0.3 - 0.2 bars) (60.9 ± 4.35 - 2.90 psi) - pressure increasing (opening)
3.7 ± 0.1 bars (53.66 ± 1.45 psi) - pressure decreasing (closing).
- In the event of pressurization loss, pressure in reservoir will not be lower than 3 bars (relative pressure) after 3 hours operation.

5. Engine Pumps
(Ref. Fig. 012)
(Ref. Fig. 013)
(Ref. Fig. 015)
When the engines are running, these pumps are normally used alone to pressurize the hydraulic systems.

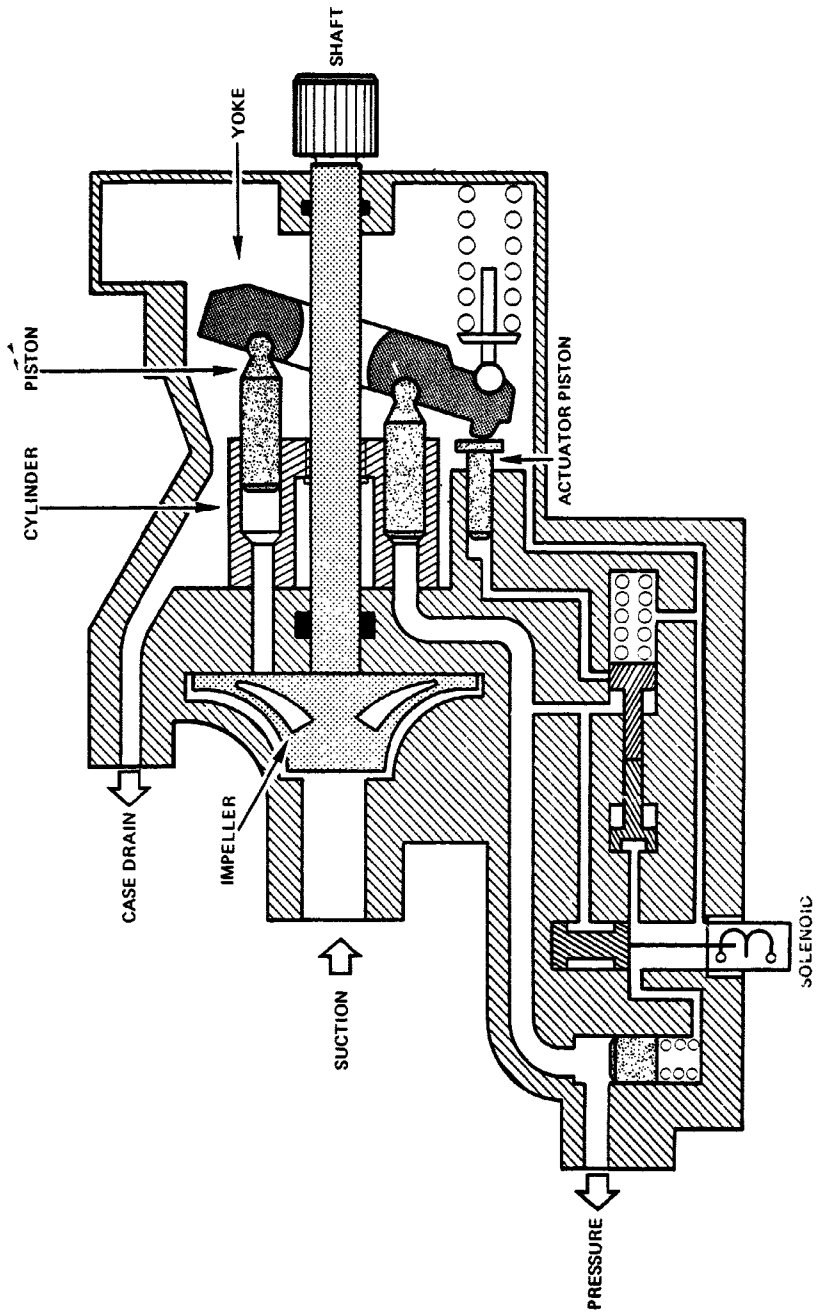
A. Location and Drive
The pumps are mounted on and driven by the engine accessory gearboxes, which in turn are driven by the HP compressor :
One Green system pump and the Blue system pump are mounted under engine 1.

One Green system pump and the Yellow system pump are mounted under engine 2.
Rotational movement is transmitted to the pump by a splined shear-type drive shaft. A drain manifold recovers any oil leakage from the accessory gearbox end and any hydraulic fluid leakage from the pump end, allowing the origin of the leakage to be determined and the accessory gearbox seal or pump seal to be changed.

B. Description and Leading Particulars
The four pumps are of the variable displacement type and are identical. They include nine pistons to which rotational motion is imparted by a cylinder block, and reciprocating motion by a variable-angle yoke. Varying the angle of the yoke allows nominal pressure to be maintained within a wide range of delivery volumes, proportional to engine speed. Servo pressure for changing the yoke angle is delivered by a compensator valve, spring loaded in one direction and outlet pressure actuated in the other.
. Nominal fluid : 136 + 5 l/mn - 0 (35.93 + 1.3 US gal/mn) - 0 at rated delivery speed of 3540 rpm.
. i.e 102.92% N2 for engine (GE)
. Nominal pressure : 206 + 3 - 0 bars (3000 psi) at zero delivery.
196 bars (2842.7 psi) at nominal delivery.
. (Ref. Fig. 015) indicates pump rotation speeds according to the flight phases, these corresponding to a typical 90 mn flight.
NOTE : minimum engine idling speed :
- for engine (GE) : N2 = 5526 rpm bence a pu p rotation speed of 1934 rpm and fluid delivery of 76.5 l/mn (20.58 US Gal)
. Case drain leakage rate is approximately 2.5 GPM for a pump rotation speed of 3750 rpm.

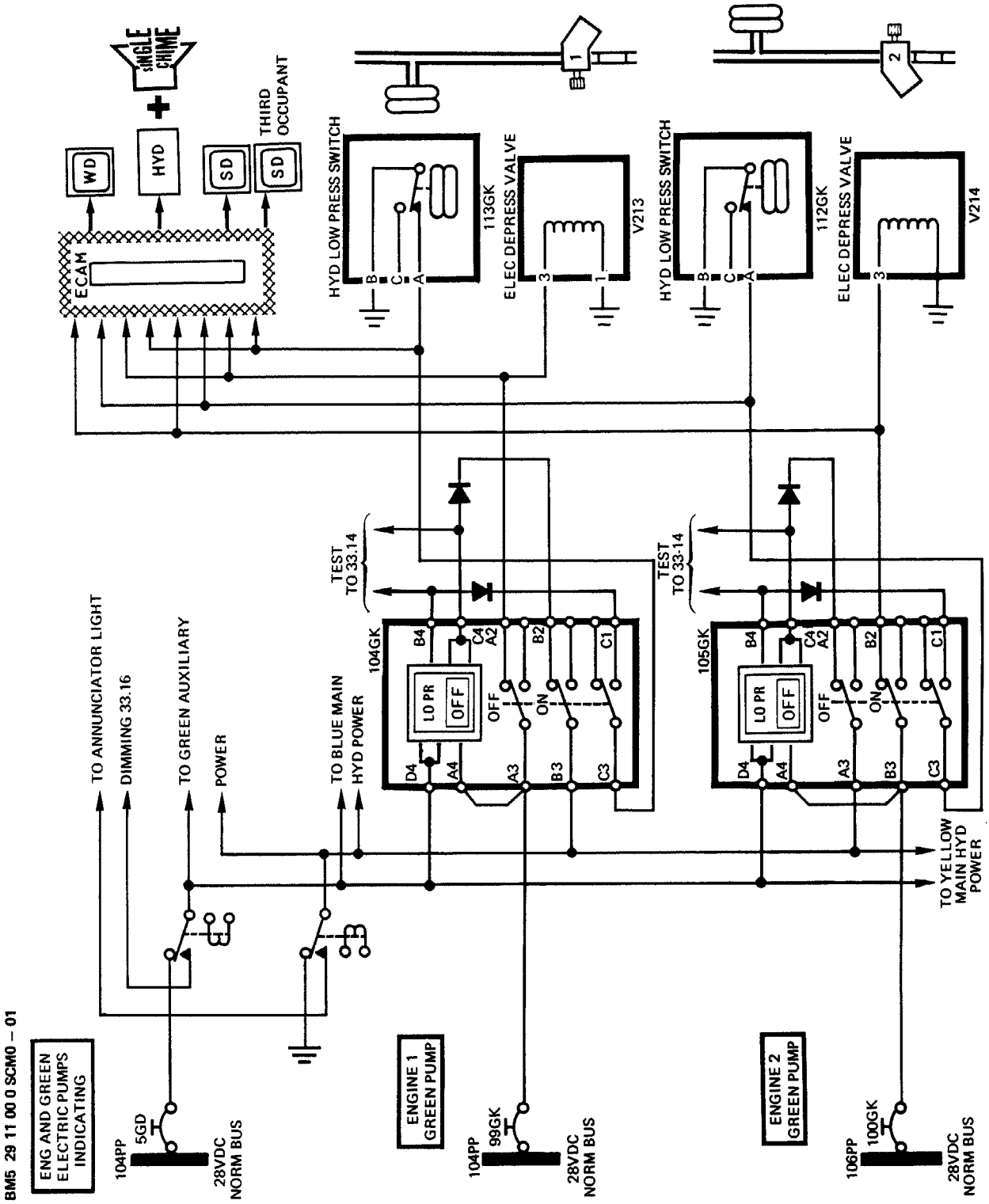
C. Pump Deactivation
Each pump is deactivated by releasing the associated pushbutton switch on the overhead panel. This activates the pump depressurizing valve solenoid. A blocking valve then isolates delivery whilst the yoke is repositioned perpendicular to the drive shaft to reduce delivery to almost zero. The pump is lubricated by internal leakage.

D. Hydraulic Connections (Ref. Fig. 014)
The pumps are connected to the engine pylon by high temperature resistant



BM5 29 11 00 0 ACMO

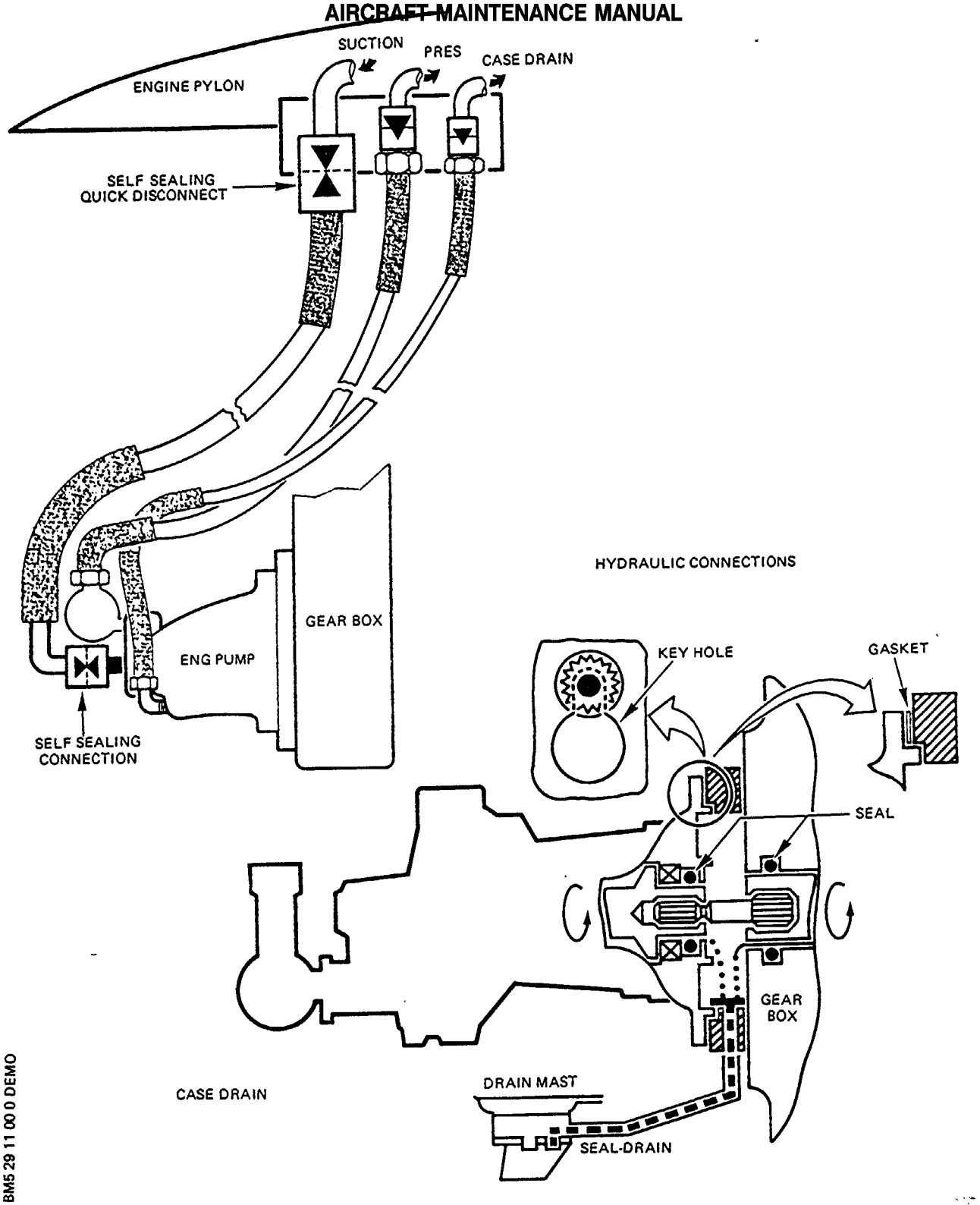
Engine Pump - Schematic
Figure 012



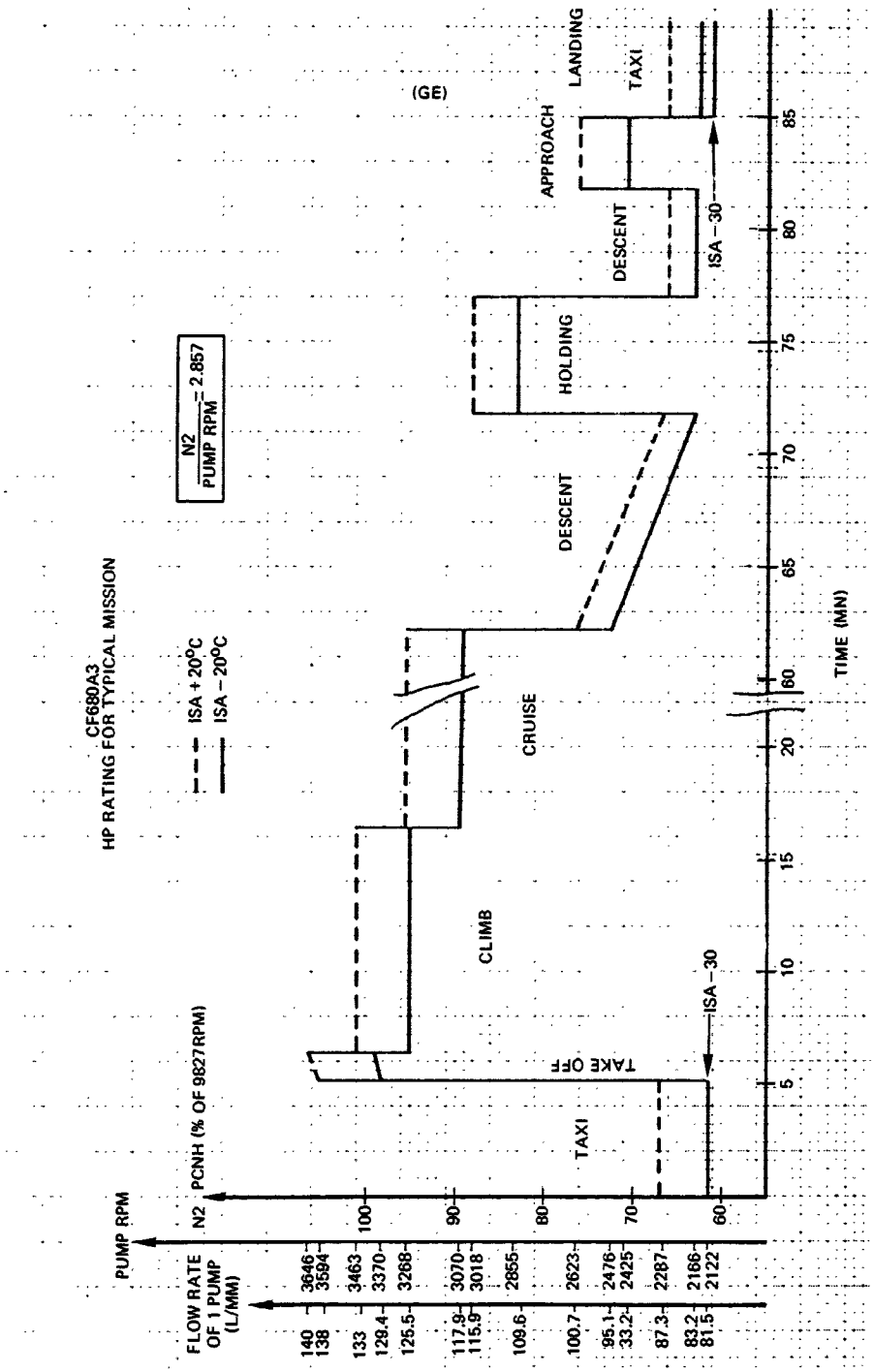
Green Engine Pumps Control and Monitoring
Figure 013

flexible hoses and stainless steel pipes, allowing quick removal of the pumps.

- Suction
  Suction hoses are equipped at each end with a self-sealing coupling.
  NOTE : In the event of an engine fire, fire valves located in the wing shut off the supply of fluid in the suction lines. Pump operating time before degradation is then limited to 5 minutes.
- Delivery
  A spherical pulsation dampener is mounted at the pump end, a check valve at the pylon end, and a pressure switch between the two. The pressure switch is set to operate at 125 bars (1810 psi) when pressure is decreasing.
- Case drain
  The case drain hose recovers pump internal leakage. It includes a 15 µ (0.0006 in.) absolute filter in the middle and a check valve at the pylon end.



Hydraulic Pump Connections
Figure 014



BM5 29 11 00 0 DJMO

Pump Flow Rate Versus Engine RPM (GE)
Figure 015

6. Manifolds
(Ref. Fig. 009)

R Component location..... 29.11, 29.12 and 29.13

A. Servo Controls Manifolds :
. The servo controls manifolds each receive pressure, through a filter and a check valve, from the engine pumps and the ground connectors (and the RAT in the case of the Yellow system).
. They deliver pressure to the HP manifolds except when the power source is either the Green system electric pumps only, or one power transfer unit (Green/Blue or Green/Yellow), in which case the opposite occurs.
. They deliver pressure to the flight controls sub-systems through an electrohydraulic servo controls selector valve, downstream of which is a pressure switch and a sampling valve.

B. HP Manifolds :
The HP manifolds receive pressure :
. Directly from the servo controls manifold
. From the electric pumps or power transfer units, through a filter and a check valve.
They distribute pressure :
- Directly to the servo controls manifold.
- To the motors and selector valves of the landing gear, flaps and slats.
- To the standby generator manifold installed upstream of the flap motor. These are large power consumers and pressure is delivered to them through a priority valve which isolates them in the event of low pressure conditions.
- To the power transfer unit motors and to the normal braking system. These are isolated by the associated selector valves when not operating (Green system only).
In addition to the priority valve, they include :
- A pressure transmitter
- Two pressure switches set to operate at 100 ± 5 bars (1450 ± 72.5 psi) when pressure is decreasing.
- A pump delivery relief valve with manual depressurization feature.
Characteristics specific to the Yellow system manifold are described in section 29-13.

C. Return Manifolds
The return manifolds receive return fluid separately from the user services and case drains through check valves (except in the case of the servo controls to allow interconnection of the servo control chambers in the event of loss of pressure in the associated system).
Fluid is returned to the reservoir through the return filter, located near the reservoir.
The return manifolds are located near the HP manifolds (only the Yellow system manifolds are located away from the reservoir).

7. Power accumulators (Ref. Fig. 016)

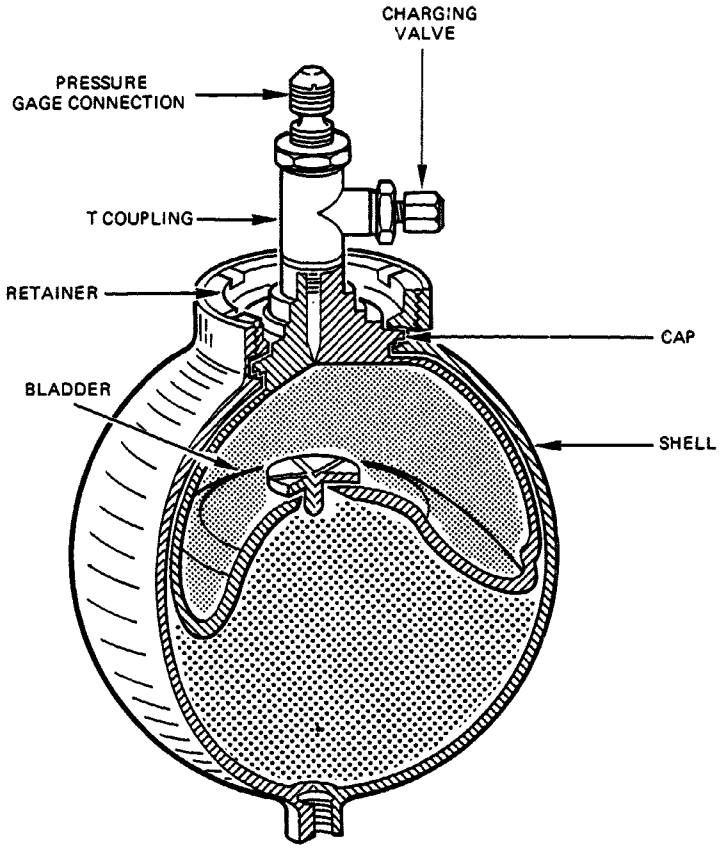
The power accumulators on the HP manifold in each system dampen pump delivery pulsations and any pressure surges, and compensate for pump response time in the event of high output demand.

They are spherical, bladder type accumulators, with a charging pressure of 100 bars (1450 psi) at 20° C (68° F). 144 bars (1665 psi) at 60°C, 90 bars (1305 psi) at -10°C (14°F) and 86 bars (1247 psi) at -20°C (4°F). Charging of each accumulator is achieved via an air charging valve, connected to a direct-reading pressure gage.

The minimum volume of fluid which can be liberated between 206 bars (3000 psi) (hydraulic system nominal pressure) and 135 bars is 250 cm³ (15.2 cu.in.) throughout the temperature range + 20° C to 110° C (+ 68° F to + 230° F).

The power accumulators are secured to mounts attached to the structure The quick-release fastening system includes a safety device protecting the accumulator against vibrations.

The accumulators are installed in such a way that any accidental burst would not cause damage to more than two systems at a time.



BM5 29 11 00 0 DLMO

Accumulator
Figure 016

8. Valves (Ref. Fig. 017, 018)

A. Fire Valves : 2 Green - 1 Blue - 1 Yellow
- . The fire valves isolate engine pump suction in the event of engine fire.
- . They are located in the wing, near the firewall.
- . They each consist of a plug valve actuated by a 115 V, 400 Hz quarter-turn electric actuator (Ref. Fig. 017).
- . The valve opens or closes in 1.8 s maximum.
- . They are controlled from the flight compartment by two ENG FIRE handles on the overhead panel. Four annunciators on the lateral panel indicate the position of the valves. (Ref. Fig. 018)
- . The Yellow system fire valve is also controlled in the closing direction when low level (5 l) (1.32 US Gal) is sensed in Yellow system reservoir Ref. 29-13 and 29-31

B. Relief Valves (with manual depressurization feature in some cases). (Ref. Fig. 019)

(1)High output relief valves with manual depressurization facility for use on the ground - one on each HP manifold, returning fluid directly to the reservoir.
If a pump jams in high output configuration, the restriction of the flow rate of fluid that occurs as it passes through the valve causes rapid overheat and a temperature warning in the flight compartment.
Setting : Opening 234-238 bars (3393-3452 psi)
Closing 220 bars (3191 psi) min.
Pressure drop through high output relief valve should not exceed 15 bars (217 psi) for a max. flow rate of 140 l/mn (37 US Gal).

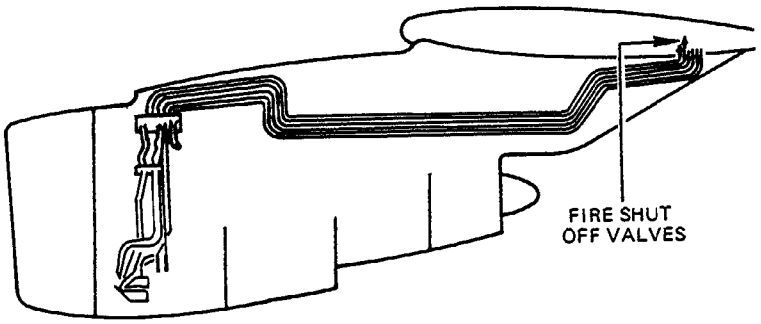
(2)Thermal relief valve with manual depressurization facility for use on the ground - on the braking section of the Yellow system HP manifold. It returns fluid directly to the reservoir, e.g. in the event of brake accumulator overheat.
Setting : Opening 234-238 bars (3393-3452 psi)
Closing 220 bars (3191 psi) min

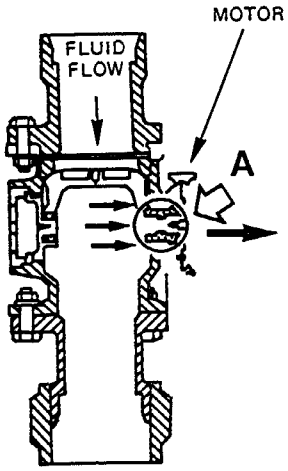
(3)Relief valve on cargo compartment door pressure supply line.
Setting : Opening 231-238 bars (3350-3452 psi)
Closing 220 bars (3191 psi)

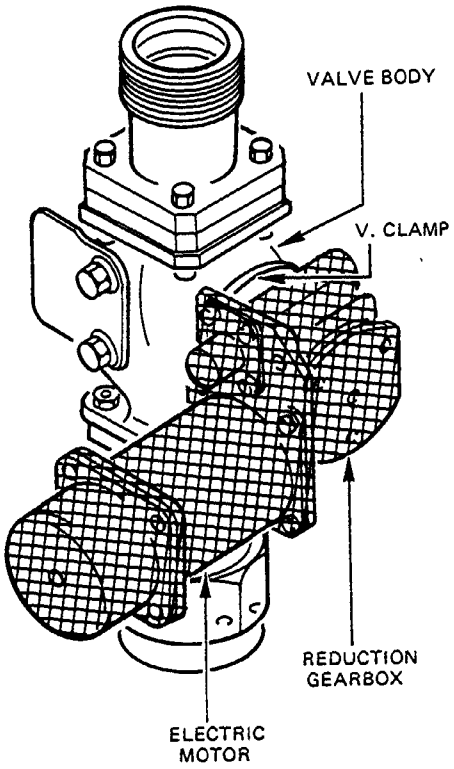
(4)Thermal relief valves on cargo compartment door actuating lines (4 : opening and closing of each door).
Setting : Opening 258-265 bars (3742-3843 psi)
Closing 240 bars (3480 psi)

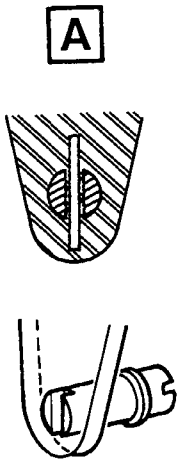
(5)Reservoir depressurization/relief valves - 1 on each ground service panel.
Setting : Opening 4.2 + 0.3 - 0.2 bars (60.9 + 4.35 - 2.90 psi)
Closing 3.7 + 0.1 - 0.1 bars (53.6 + 1.45 - 1.45 psi)

C. Priority Valves
Priority valves are mounted on the HP manifolds to cut off power supply to heavy power users: landing gear, flaps and slats, in the event of low pressure (hydraulic pumps saturated), thus ensuring priority to the servo controls. A fourth valve isolates the Yellow hydraulic motor in the trimmable horizontal stabilizer actuator.



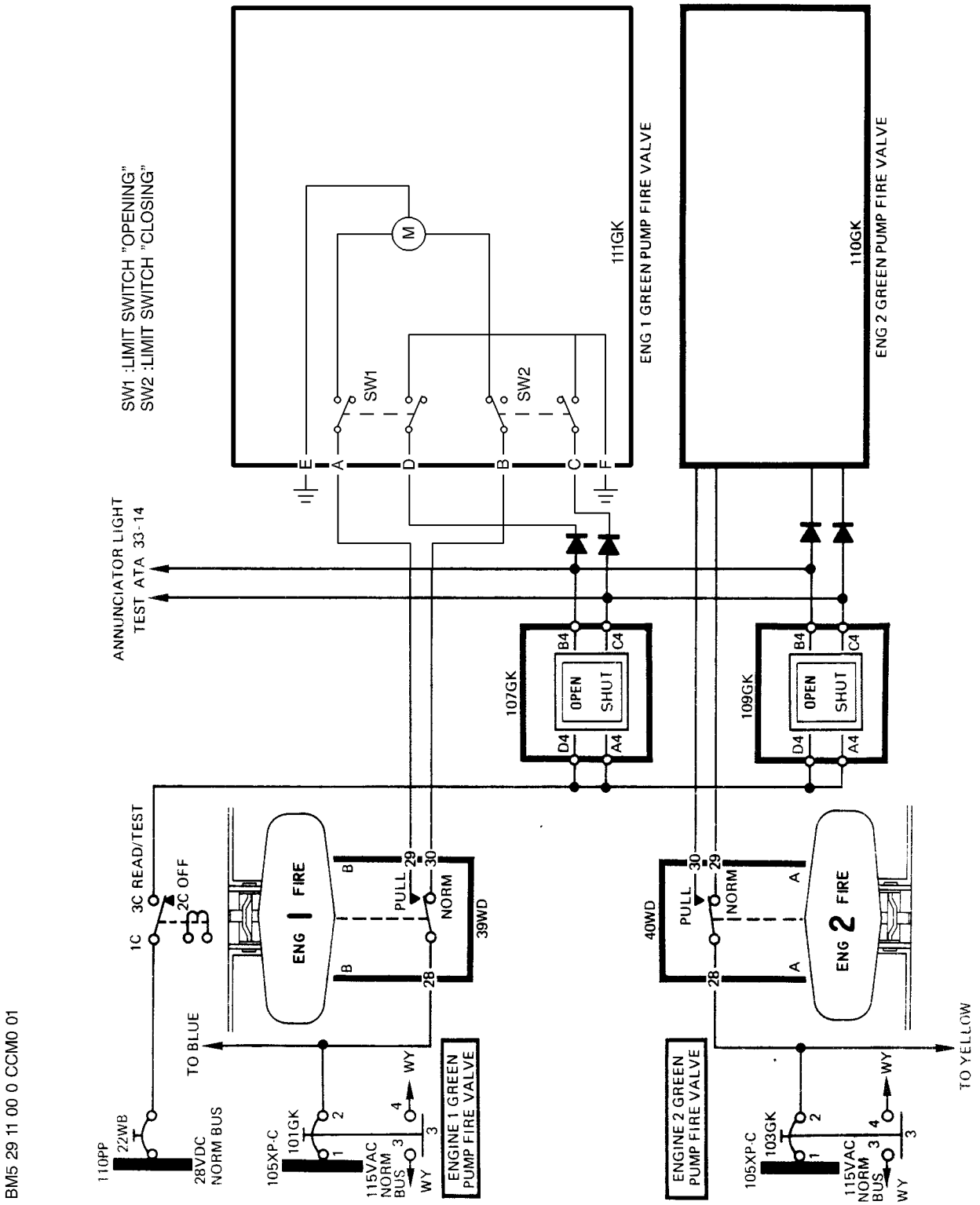






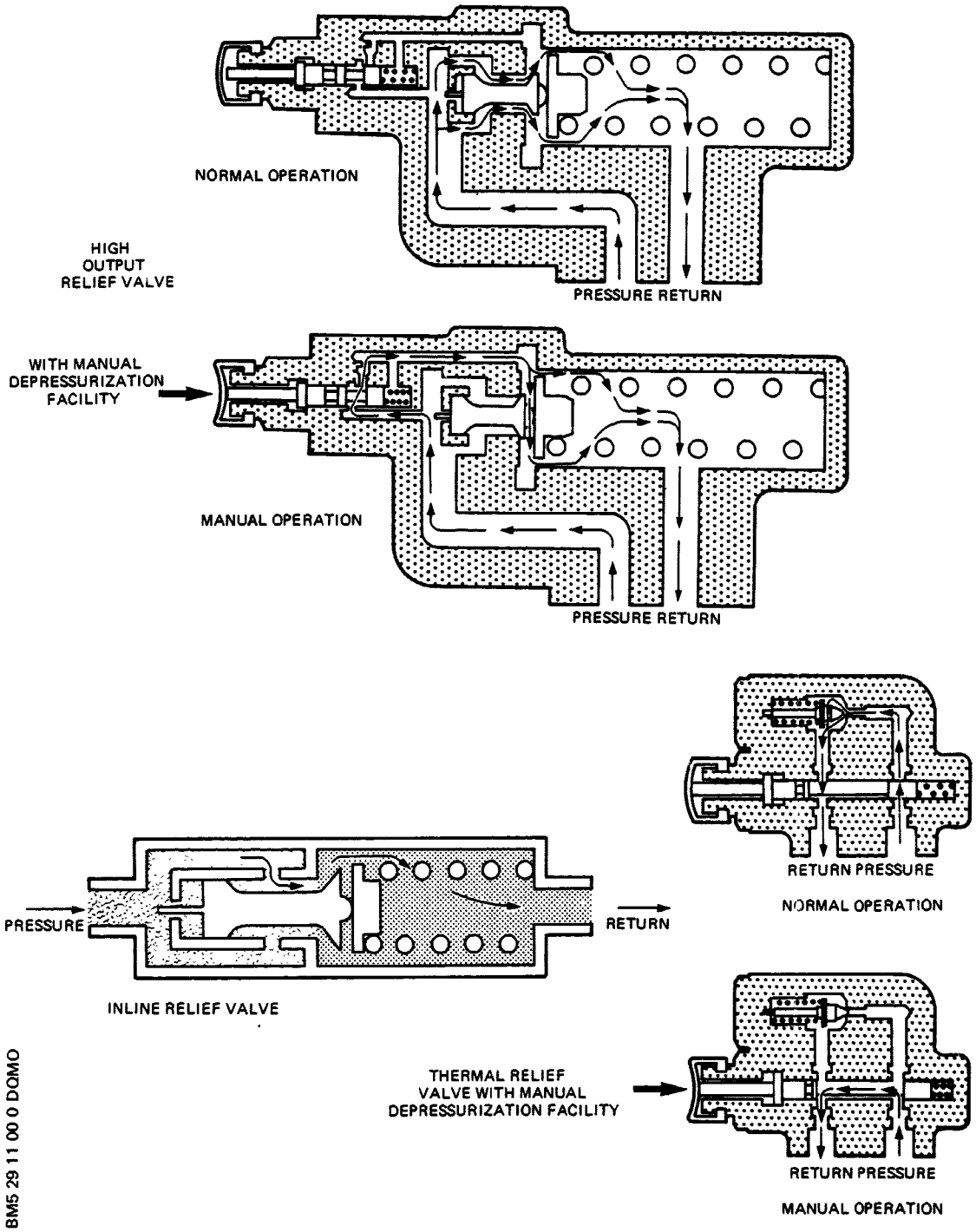
BM5 29 11 00 0 DNMO

Fire Valve
Figure 017



BM5 29 11 00 0 CCM0 01

Green Pump Fire Valves Control
Figure 018



Relief Valve, Functional Diagram
Figure 019

Setting : Close when pressure downstream of the valves is 130 bars (1885 psi). Max. flow rate at 165 bars (2393 psi) max relative pressure.

D. Safety Valves

Safety valves isolate certain sections of lines in the event of excessive fluid flow due to a rupture on :

- Each normal and standby supply line of each brake.
- The rudder Green servo control.
- Krueger flap and droop actuator power supply line (Green system).

E. Selector Valves : Electric - Hydraulic - Manual

Isolate and control each user or group of users, and include :

Servo controls	: three electrohydraulic selector valves : Green, Blue, Yellow, on the servo controls manifold, (open : solenoid de-energized)
Slats	: two solenoid valves : Green, Blue, on power control unit motors.
Flaps	: two solenoid valves : Green, Yellow, on power control unit motors.
Krueger flap and droop actuators	: one green selector solenoid valve near Green system servo controls manifold.
Landing gear	
Ext/Ret	: one Green selector valve in the center of the landing gear well ceiling
Nosewheel steering	: one Green selector valve in the nose gear well
Normal braking	: one Green selector valve on the HP manifold
Normal/alternate braking	: One brake automatic selector in the landing gear well aft center ceiling
Parking	: one Yellow parking brake selector in the nose gear well
Cargo compartment doors	: Two selector valves on the HP manifold plus Two manually operated control valves at the doors.
Power transfer units	: Two solenoid controlled flow shut off valves on the Green system driven motors.
Standby generator	: one standby generator selector valve.

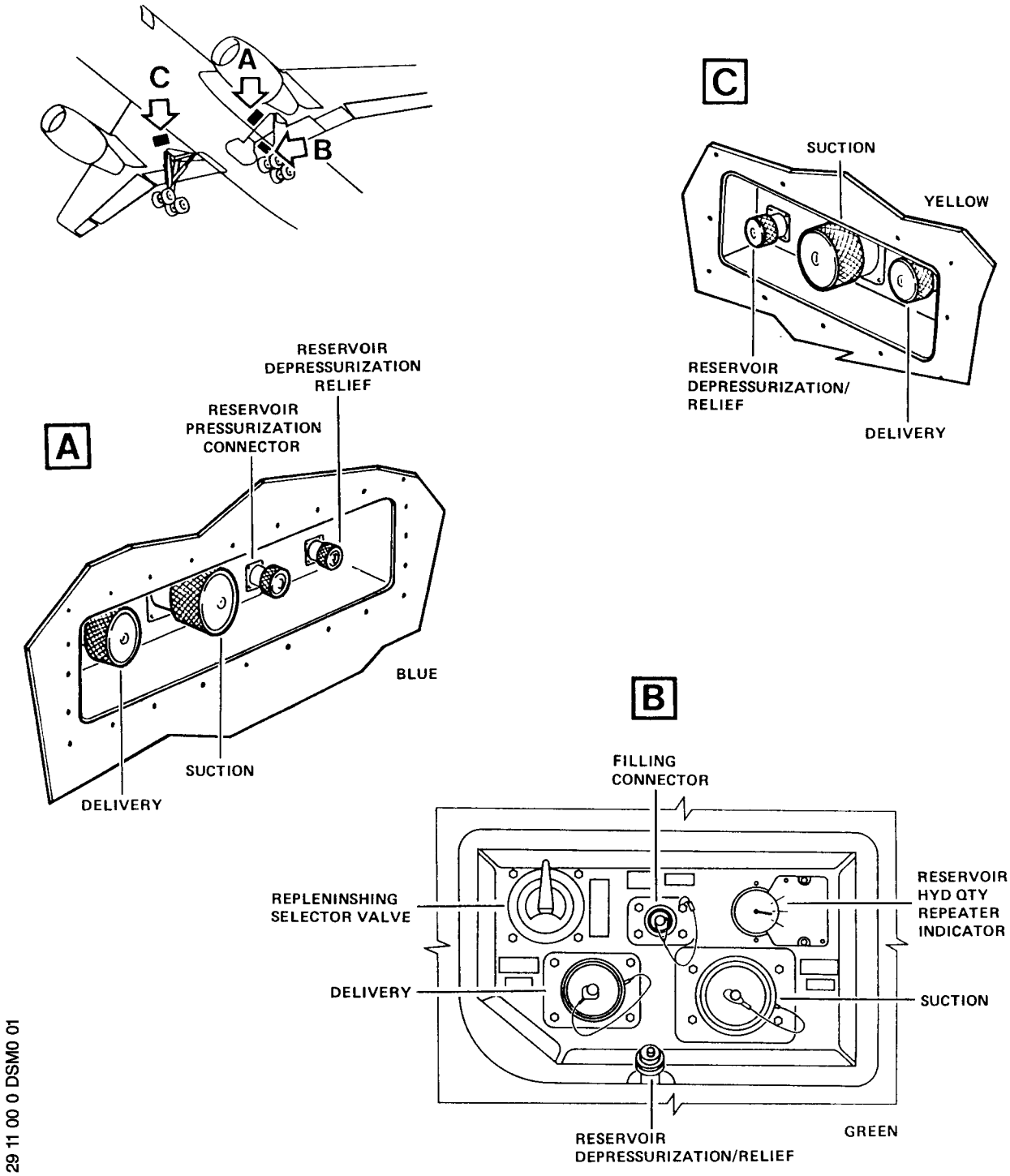
F. Check Valves

Check valves are placed wherever required to protect or isolate certain items, in particular on the delivery line of each pump.
All check valves have end fittings of different dimensions at each end to prevent installation in the wrong direction.

G. Self-Sealing Connectors

Easily accessible self-sealing connectors are provided on each system for connection of a ground replenishing unit location.
(Ref. Fig. 020)

- in L wing :
  . 1 on Blue system suction line,
  . 1 on Blue system delivery line,
  . 1 for reservoir depressurization with built-in pressure-relief valve,



Hydraulic System Ground Service Panels
Figure 020

. 1 for Green, Blue and Yellow system reservoir pressurization
- in R wing :
. 1 on Yellow system suction line
. 1 on Yellow system delivery line
. 1 for reservoir depressurization with built-in pressure-relief valve
- in hydraulics compartment :
. 1 on Green system suction line,
. 1 on Green system delivery line,
. 1 for reservoir depressurization with built-in pressure-relief valve
. 1 for Green, Blue and Yellow reservoir filling.

H. Isolation Valve Blocks - Leakage Measurement
Measuring internal leakage on the ground makes it possible to check that total leakage in a system remains within limits in keeping with safety criteria. In particular, ram air turbine pump output imposes a maximum leakage rate compatible with the minimum acceptable speed for control surface actuation.
Leakage measurement also provides a means of checking component condition during maintenance operations, especially in the context of on-condition maintenance. The isolation valve blocks are located near the servo controls manifold on each system. They allow power to be supplied separately to the servo controls in :
the LH wing, the RH wing, the tail unit.
A flowmeter on the ground cart pressure line enables leakage to be measured in various portions of a given system, depending on which valves are open.

J. Sampling Valves
Sampling valves are installed on each pressure line downstream of the servo controls selector valve. They are used to take samples of hydraulic fluid for contamination monitoring.

9. Filters

A. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures - 12-12-00, P. Block 1	Hydraulic Fluids

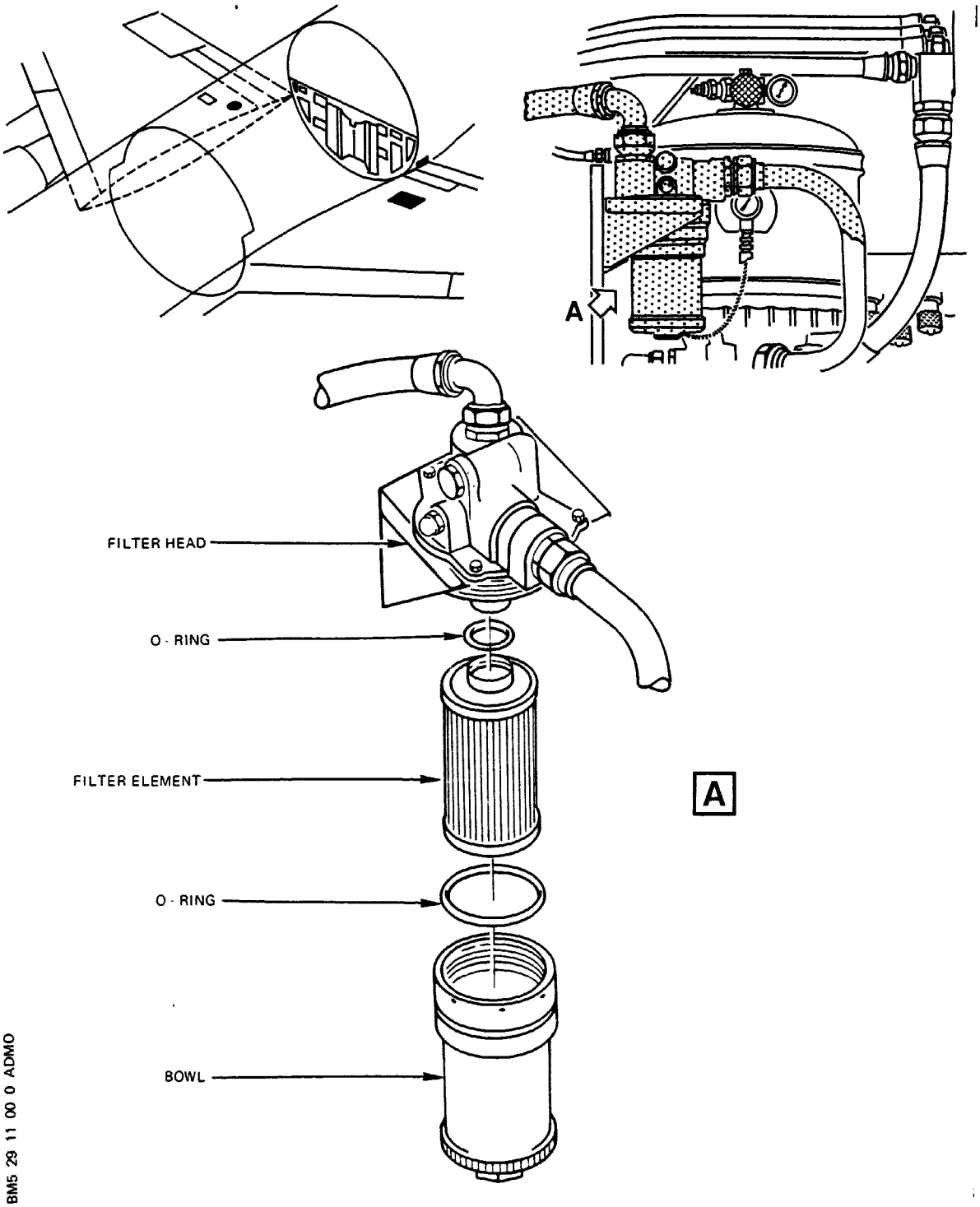
B. Filters are used to maintain hydraulic fluid in a state of cleanliness compatible with use of numerous servovalves.
Fluid contamination is monitored by particle counts of samples taken at special sampling valves located downstream of the servo controls manifold.
The maximum particle contamination must be lower than NSA307110 class 9 (Ref. 12-12-00, P. Block 1).
Type and location
Filter elements may be either cleanable or disposable.

C. HP Filters
1 on the main Blue system.
2 on the main Green system.
1 on the main Yellow system.
1 on the Green/Blue power transfer unit delivery line.
1 on the Green/Yellow power transfer unit delivery line.
1 on the Green system braking line.
1 in the reservoir filling system.
1 on the delivery line of the Green system electric pumps.
1 on the Yellow system electric pump delivery line.
These filters are of the non bypassing type, with a clogging indicator set to operate at 6 bars (87 psi) ± 10%.
Filtering capability is 3 to 15 μ (0.0001 in. to 0.0006 in.) absolute.
An automatic shutoff mechanism in the filters prevents any leakage and any fluid flow between the filter inlet and outlet when the bowl and filter element are removed, and prevents ingress of air into the system when the filter is installed. Filter elements may be either cleanable or disposable.

D. Return Line Filters : near the reservoir (Ref. Fig. 021)
One on each line comprising a 3 μ (0.0001 in.) absolute filter element (disposable type only), a clogging indicator (set to operate at 3 ± 0.5 bars) (43.8 ± 7.3 psi), bypass system (setting : 5 ± 0.5 bars) (73 ± 7.3 psi), and a dash-pot on clogging indicator supply line. The filters also have an automatic shutoff mechanism to facilitate removal.

E. Case Drain Filters with a filtering capability of 15 μ (0.0006 in.) absolute, allow pump wear to be monitored by detection of metallic particles in the filter elements.
These filters also incorporate a clogging indicator, but there is no bypass (the indicator is set to operate at 8.3 bars/120 psi).

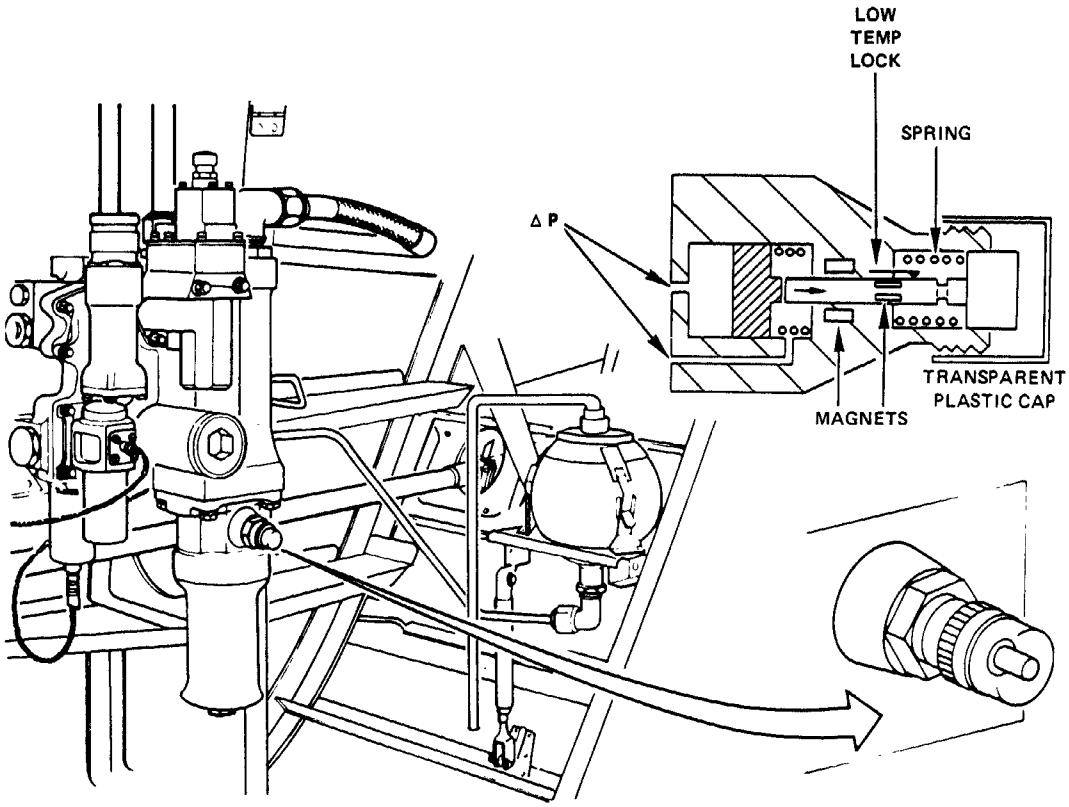
F. Clogging Indicator (Ref. Fig. 022)



Filter Element Replacement
Figure 021

When the filter is clogged, the increase in differential pressure causes the protrusion of a red colored button, visible through a transparent frame.
The filter element must be replaced as soon as possible.
The clogging indicator is reset by simply removing the transparent frame and pressing the indicator button.
In low temperature conditions, clogging indicator operation is inhibited (thermostatic locking at 0° ± 2°C (32.9 ± 3.6°F) with unlocking at 30°C (86°F).

G. Integral Protective Filters
- In addition to these main filters, the hydraulic systems also include protective filters integral with certain components, in particular the servovalve.



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Filter Clogging Indicator
Figure 022

10. Pressure Switches and Pressure Transmitters

A. The pressure switches are installed :
- 1 on the delivery line of each engine driven pump to activate a warning in the event of pump low pressure condition.

Two restrictors (291702-291703) are installed in the pylons on the manifold pressure switch for the Green system only.
During cruise, there is a low flow demand. Therefore, only one pump delivers the flow needed and the second pump is on standby (different pump setting).
In order to avoid possible fluid overheating inside the pump which is on standby, the restrictor has been installed to authorize a minimum flow from the pressure line to the case drain and a subsequent flow into the engine driven pump.

- 1 on the common delivery line of the Green system electric pumps to indicate a pressure drop when these electric pumps are suplied with power.
- 1 on the HP manifold of each system to indicate a low pressure condition in the system.
- 1 on the servo control manifold of each system to indicate a low pressure condition.
- 1 in the ram air turbine pump delivery system, mounted on the ground checkout module.
- 1 on each reservoir to detect a low air pressure condition.

B. A pressure transmitter is mounted on the manifold of each one of the 3 systems.
The operating principle is based on a variable reluctance.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. RESERVOIR

A. Equipment and Materials

ITEM	DESIGNATION
A.	Safety Barriers
B.	Warning Notices
C.	Hydraulic Fluid Containers
D.	Access Platform 2.6 m (8 ft. 8 in.)
E.	Corrosion - Resistant Steel Lockwire, Dia. 0.8 mm (0.032 in.)
F. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00, P. Block 1)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-00-00, P. Block 301	General Servicing
- 29-00-00, P. Block 401	General - Removal/Installation
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

(1) Job Set-up
(a) On overhead panel 427VU in flight compartment :
1 Make certain that Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).
2 Display a warning notice prohibiting pressurization and use of Green hydraulic system.
(b) Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)
(d)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(e)Install access platform at zone 147.
(f)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(g)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(h)Place container under reservoir to be drained and place absorbent material around unions.
(j)Drain Green hydraulic reservoir (Ref. 29-00-00, P. Block 301).

(2)Removal

R **ON A/C 104-104,

(Ref. Fig. 401)

R **ON A/C 001-103, 105-200,

(Ref. Fig. 402)

**ON A/C ALL

(a)Disconnect electrical connectors (1), (4) and (10).
(b)Disconnect the following lines : engine pump suction (8), reservoir depressurization/relief (7), reservoir pressurization (2) and return. (6).
(c)Plug/cap reservoir ports and open line ends.
(d)Remove bonding strip.
(e)Cut and remove lockwire and loosen clamp screws of both straps.
(f)Remove reservoirs.

(3)Preparation of replacement component

WARNING : THE REPLACEMENT RESERVOIR IS EQUIPPED WITH ITS CONNECTIONS, ATTACHING SCREWS INSTALLED BUT BOT TIGHTENED.

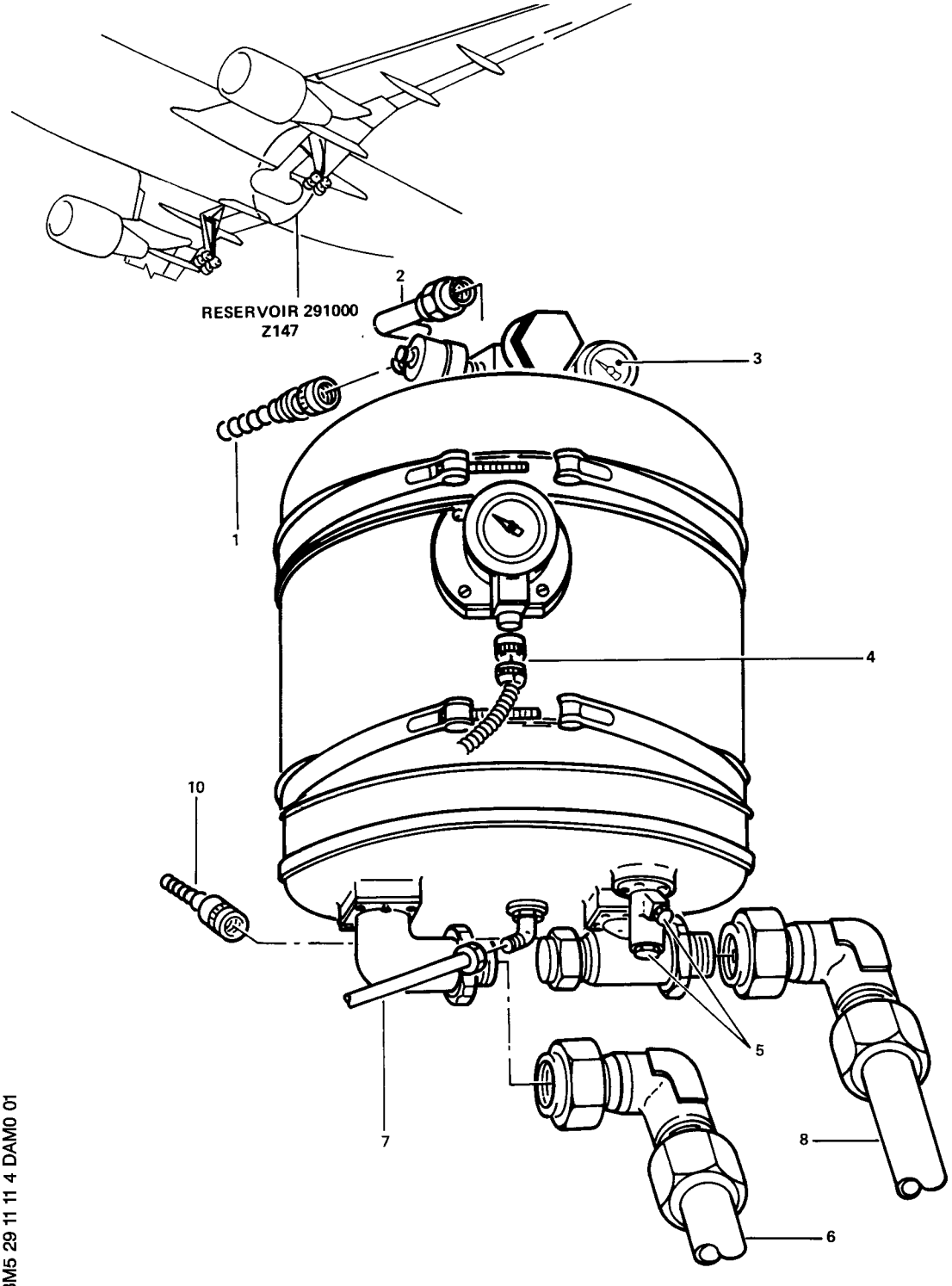
(a)Check that reservoir to be installed has not sustained any deterioration due to impacts or/and distortion and that paintwork is free from any scratches. Check that pressure and quantity gage glasses are in good condition.
(b)Remove blanking plugs/caps and lubricate union threads with Material No. 02-003 (Ref. 20-31-00, P. Block 1).

(4)Installation

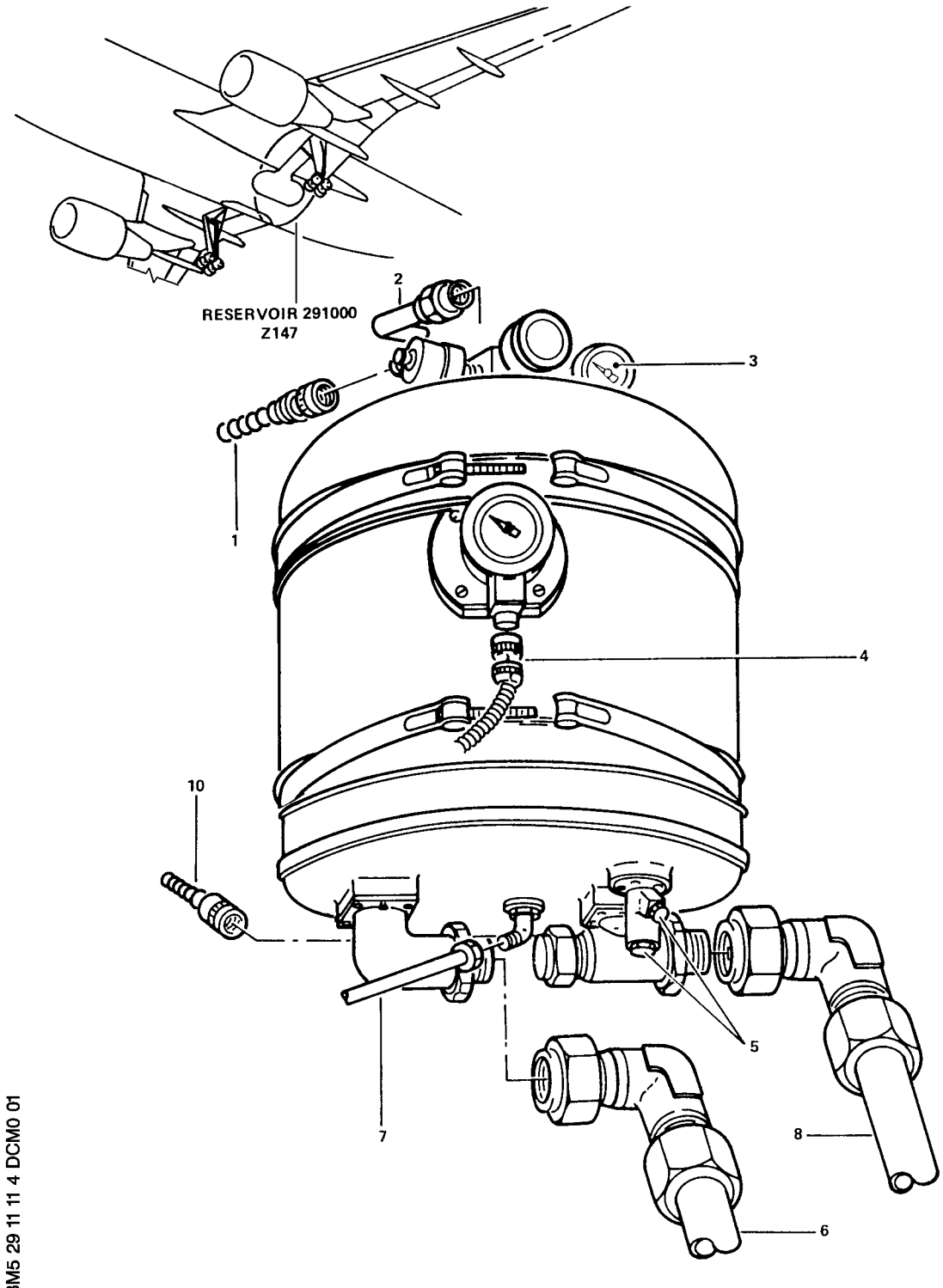
(a)Position reservoir in its cradle.
(b)Install the two straps. Do not tighten straps.
(c)Connect the following lines : reservoir return (6), reservoir depressurization/relief (7), reservoir pressurization (2) and engine pumps suction (8).
(d)TORQUE the screws of the replacement reservoir connections to 0.5 m.daN (3.7 lbf.ft.) and wirelock.
(e)Connect electrical connectors (1), (4) and (10).
(f)Install bonding strip.
(g)Tighten reservoir attaching straps and wirelock clamp nuts.

(5)Tests

(a)Remove safety clips and tags and close circuit breakers 1GQ, 1GR, 1GL,



Green Hydraulic Reservoir
Figure 401



Green Hydraulic Reservoir
Figure 402

6GL and 4GE.
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronic racks ventilation is correct.
(c)Fill reservoir (Ref. 12-12-29, P. Block 1).
NOTE : Filling can be performed with reservoir not pressurized provided that reservoir is initially empty.
(d)Pressurize reservoir (Ref. 29-14-00, P. Block 301) and perform a fluid level check (Ref. 12-12-29, P. Block 1).
(e)Make certain that drain valve plugs (5) are wirelocked.
(f)Visually check for leakage of hydraulic fluid at the various line connections.
(g)Check for leakage of air, using soapy water and direct reading pressure gage (3).
(h)Check that quantity transmitter direct reading gage and quantity indicator in flight compartment read same indication.
(6)Close-up
(a)Remove container and absorbent material.
(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(c)Remove warning notices.
(d)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(e)De-energize the aircraft electrical network and (Ref. 24-41-00, P. Block 301).

2. Pressure Switch

A. Equipment and Materials

ITEM	DESIGNATION
A.	Safety Barriers
B.	Warning Notices
C.	Access Platform 2.6 in. (8 ft. 8 in.)
D.	Corrosion - Resistant Steel Lockwire, Dia. 0.8 mm (0.032 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System - Adjustment/Test.
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure
(1)Job set-up
(a)Open, safety and tag the following circuit breaker :

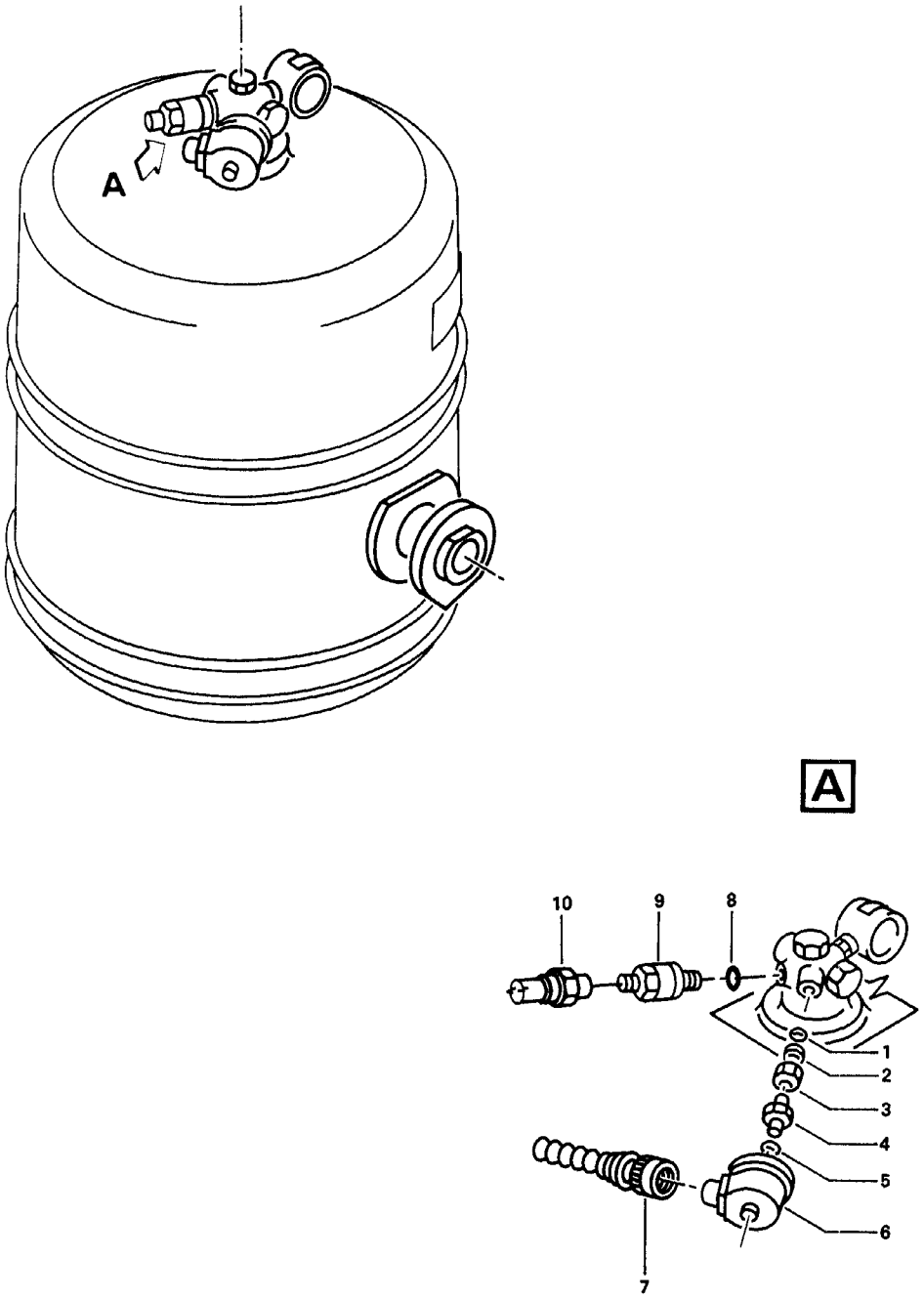
PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR WARN	1GR	333/T58

(b)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(c)Install access platform at zone 147, or 571 or 671
(d)Depressurize hydraulic system associated to reservoir (Ref. 29-10-00, P. Block 301).
(e)Display warning notices, prohibiting pressurization of the hydraulic system associated to reservoir :
1 In flight compartment, on Hyd Power Panel 427VU
2 On hydraulic system ground connector (Zone 147 or 571 or 671).
3 On hand pump for yellow system (Zone 148).
(f)Depressurize the involved hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(g)Display warning notice prohibiting pressurization of hydraulic reservoir, on hydraulic ground connector (Zone 571).

(2)Removal (Ref. Fig. 403, 404)
NOTE : If neccessary, cut and remove lockwire.
(a)Disconnect electrical connector (7).
(b)Loosen nut (3)
(c)Remove pressure switch (6) by acting on connection (4).
(d)Discard O-ring (1) and back seal (2).
(e)Unscrew nut (3) by hand.
(f)Discard O-ring (5).

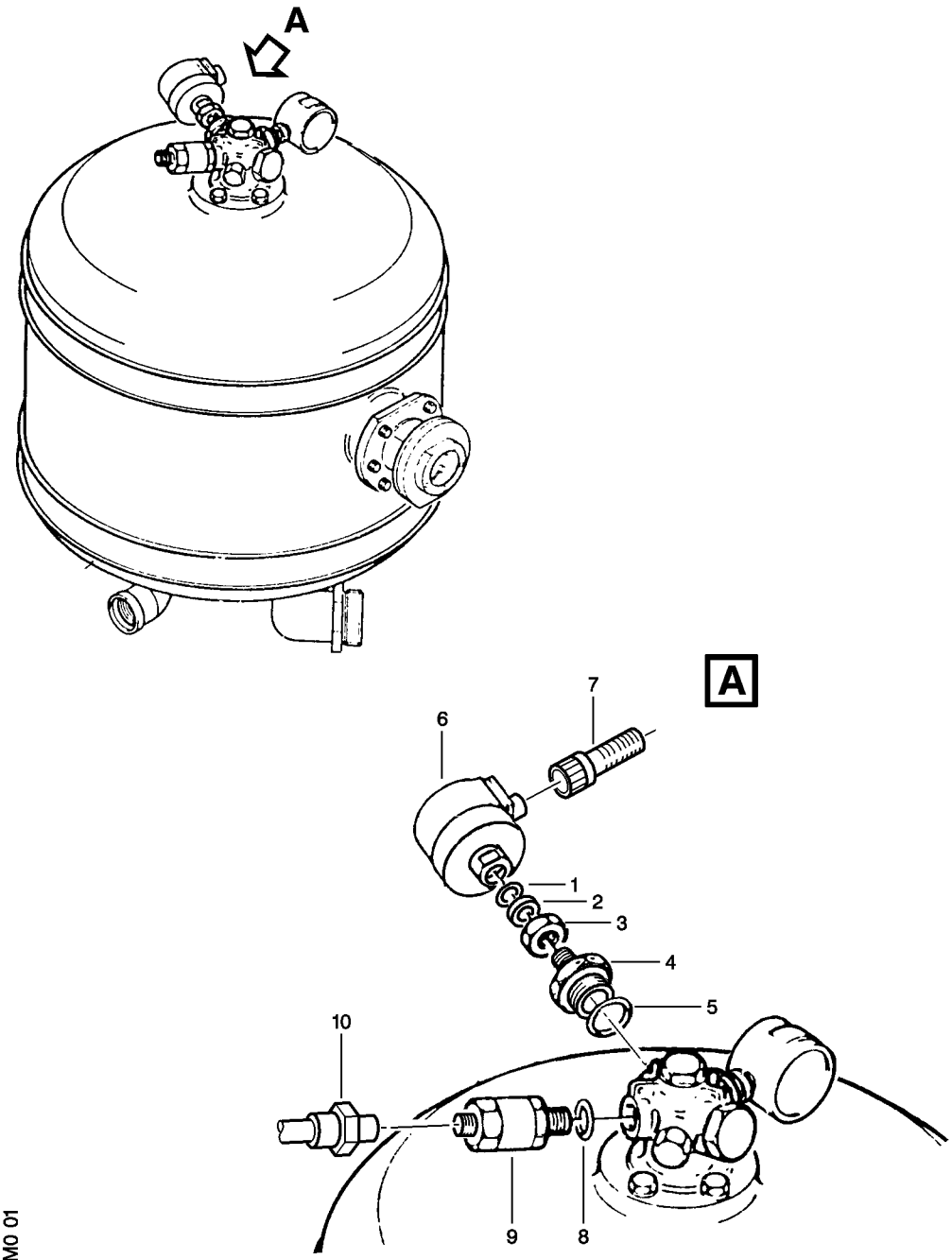
(3)Installation
(a)Pressure switch on Blue and Green reservoir :
1 Install connection (4) with a new o'ring (5) on pressure switch (6). TORQUE to 1.5 m.daN (132.7 lbf.in.).
2 Install nut (3), new back-up ring (2) and new o'ring (1) on connection (4).
3 Screw pressure switch/connection assembly on manifold part taking care to align pressure switch electrical plug with electrical connector (7).
NOTE : Have regard for pressure switch dimension between Blue and Green reservoir axis and pressure switch connector axis 79 mm ± 0.1 mm (3.11 in. ± 0.004 in.).
4 TORQUE nut (3) to 1.5 m.daN (132.7 lbf.in.).
5 Connect electrical connector (7).
(b)Pressure switch on Yellow reservoir :
1 Install connection (4) with a new o'ring (5) on manifold part. TORQUE to 1.5 m.daN (132.7 lbf.in.).
2 Install nut (3), new back-Up ring (2) and new o'ring (1) on connection (4).
3 Screw pressure switch (6) on connection (4) taking care to align pressure switch electrical plug with electrical connector (7).
NOTE : Have regard for pressure switch dimension between Yellow reservoir axis and pressure switch connector axis 81 mm ± 0.1 mm (3.19 in. ± 0.004 in.).
4 TORQUE nut (3) to 1.5 m.daN (132.7 lbf.in.).
5 Wirelock connection (4) to manifold part.
6 Connect electrical connector (7).

(4)Test
(a)Remove safety clip and tag and close circuit breaker 1GR.
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



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Pressure Switch on Green/Blue Hydraulic Reservoir
Figure 403



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Pressure Switch on Yellow Hydraulic Reservoir
Figure 404

Make certain that electronic racks ventilation is correct.
(c)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(d)Check for leakage of air using soap water at the connections and by direct reading on reservoir pressure gage.
(e)Perform functional test of the hydraulic reservoir low air pressure detection and warning circuits (Ref. 29-14-00, P. Block 501).
(f)Check that after 1 hours 30 minutes, the pressure drop read on reservoir pressure gage must be ≤0.15 bar (2.17 psi).
(5)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove warning notices.
(c)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(d)De-energize the aircraft electrical network (Ref. 24-41-00,

3. Check Valve

A. Equipment and Materials

ITEM	DESIGNATION
A.	Safety Barriers
B.	Warning Notices
C.	Access Platform 2.6 in. (8 ft. 8 in.)
D.	Corrosion - Resistant Steel Lockwire, Dia. 0.8 mm (0.032 in.)
E.	Blanking Caps, Plugs
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure
(1)Job set-up
(a)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR WARN	1GR	333/T58

(b)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(c)Install access platform at zone 147, or 571 or 671
(d)Depressurize hydraulic system associated to reservoir (Ref. 29-10-00, P. Block 301).
(e)Display warning notices, prohibiting pressurization of the hydraulic system associated to reservoir :
1 In flight compartment, on Hyd Power Panel 427VU
2 On hydraulic system ground connector (Zone 147 or 571 or 671).

3 On hand pump for yellow system (Zone 148).
(f)Depressurize the involved hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(g)Display warning notice prohibiting pressurization of hydraulic reservoir, on hydraulic ground connector (Zone 571).
(2)Removal (Ref. Fig. 403, 404)
NOTE : If applicable cut and remove lockwire.
(a)Disconnect reservoir pressurizing line (10).
(b)Install blanking plugs on line ends.
(c)Loosen, and remove check valve (9) and seal (8). Discard seal.
(3)Installation
(a)Install check valve (9) with a new seal (8).
(b)TORQUE check valve to 20 N.m (14.75 lbf.ft.).
(c)Remove blanking plugs from line ends.
(d)Connect reservoir pressurizing line (10).
(4)Test
(a)Remove safety clip and tag and close circuit breaker 1GR.
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronic racks ventilation is correct.
(c)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(d)Check for leakage of air using soap water at the connections and by direct reading on reservoir pressure gage.

(e)Check that after 1 hours 30 minutes, the pressure drop read on reservoir pressure gage must be ≤0.15 bar (2.17 psi).
(5)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove warning notices.
(c)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R **ON A/C 001-103, 105-200,

4. Green Hydraulic Reservoir Pressure Relief Valve

A. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Access Platform 2.6 m (8 ft. 8 in.)
C.	Corrosion - Resistant Steel Lockwire, Dia. 0.8 mm (0.032 in.)
D.	Blanking Plugs/Caps
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

ITEM	DESIGNATION
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

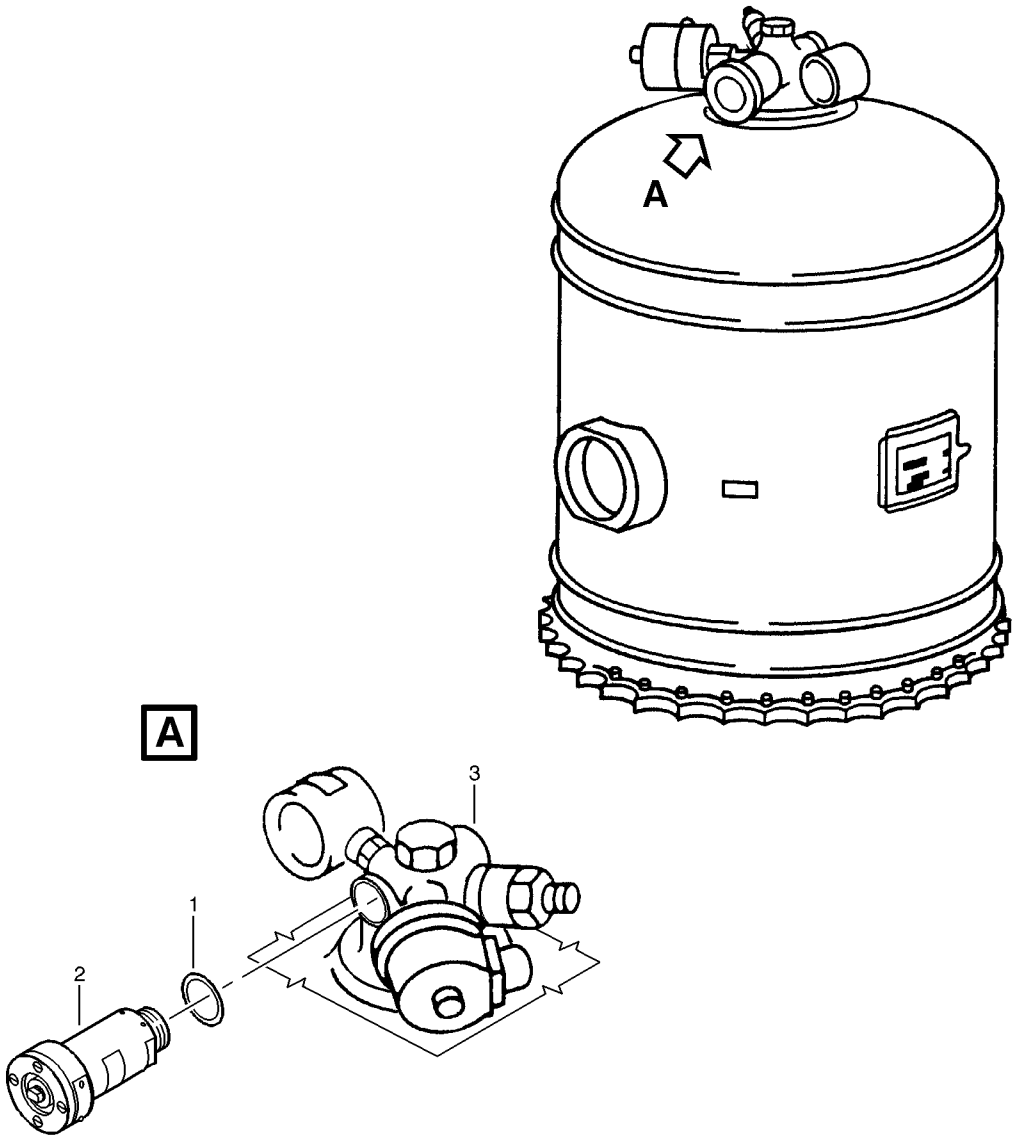
B. Procedure

(1)Job Set-up
(a)Display warning notices prohibiting pressurization of the Green hydraulic system :
1 In flight compartment on HYD PWR panel 427VU.
2 On hydraulic system ground connectors (Zone 147).
(b)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(c)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(d)Install access platform at zone 147.
(e)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(f)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(2)Removal (Ref. Fig. 405)
(a)Cut and remove lockwire.
(b)Remove pressure relief valve (2) from manifold (3).
(c)Remove and discard O-ring (1).
(d)Install blanking plug on disconnected manifold port.
(3)Installation (Ref. Fig. 405)
(a)Remove blanking plug from manifold port.
(b)Install pressure relief valve (2) with a new O-ring (1) on manifold (3).
(c)TORQUE pressure relief valve (2) to 30 m.N (22 lbf.ft).
(d)Wirelock pressure relief valve to manifold port.

(4)Test
(a)Remove safety clips and tags and close circuit breakers 1GQ, 1GR, 1GL, 4GE and 6GL.
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(c)Pressurize hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(d)Check for leakage of air using soap water at the connections.
(e)Check that after 1 hour 30 minutes, the pressure drop read on reservoir pressure gage must be ≤ 0.15 bar (2.17 psi).
(5)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove warning notices.



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Green Hydraulic Reservoir Pressure Relief Valve
Figure 405

(c)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R MANIFOLD - HP, GREEN
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Caps/Plugs
(2)	Circuit Breaker(s) Safety Clip(s)
(3)	Container
(4)	Warning Notices
(5)	Access Platform 2.6 m (8 ft. 8 in.)
(6)	Lockwire
(7)97A29102090000	Bobbin and Ring Installation Tool
(8)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
(9)Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
R - 20-23-21, P. Block 1	Hydraulic Bobbins
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (FLAPS)
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-11-55, P. Block 601	Pump Delivery Relief Valve
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 29-22-11, P. Block 401	Green/Blue Power Transfer Unit
- 29-23-11, P. Block 401	Green/Yellow Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)
- 32-42-00, P. Block 501	Normal Braking

2. Procedure

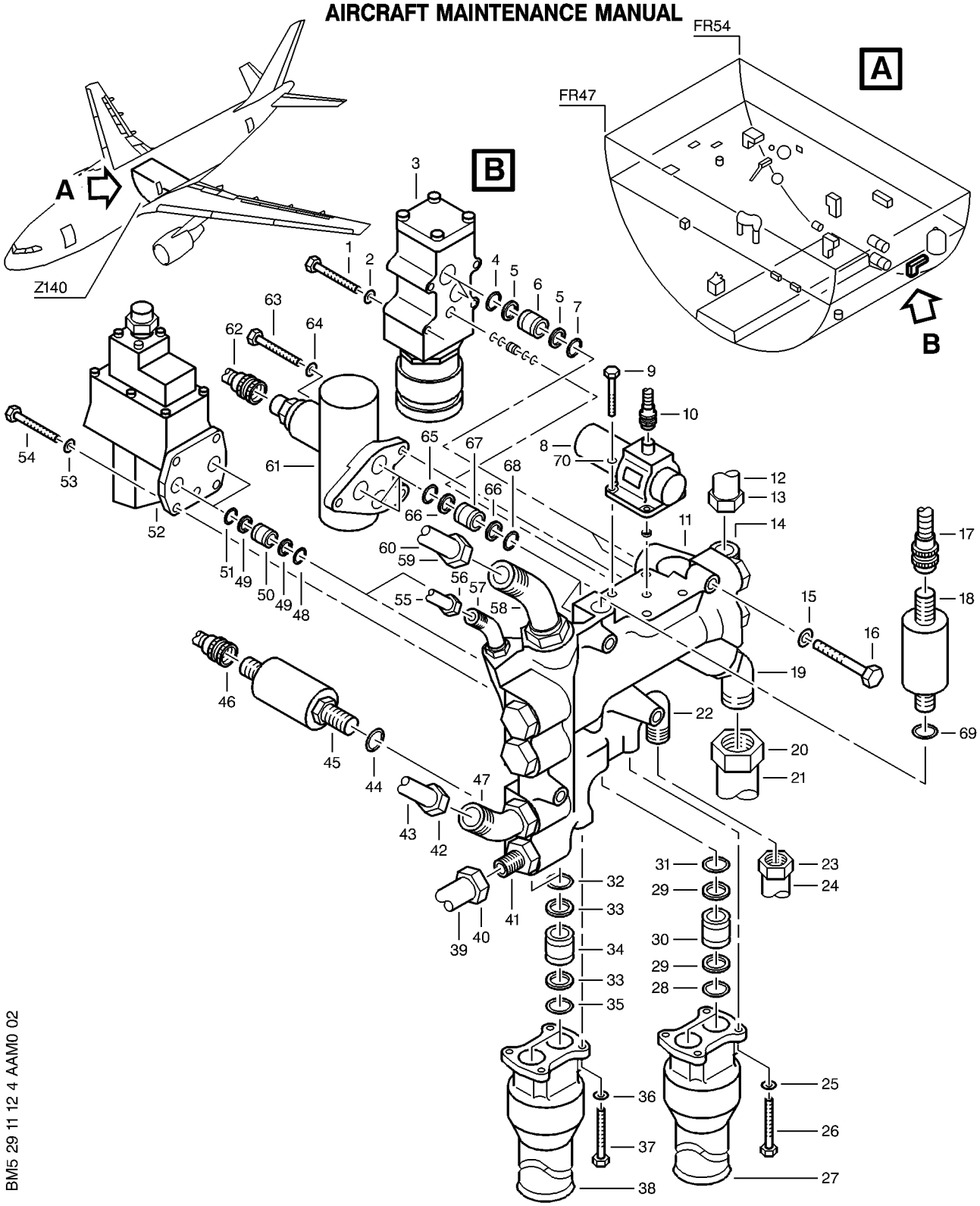
A. Job Set-Up
(1)On overhead panel 427VU in flight compartment :
(a)Make certain that Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).
(b)Display a warning notice prohibiting pressurization and use of Green hydraulic system.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Install access platform at zone 140.
(6)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(7)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Place container under reservoir to be drained and place absorbent material around unions.
(9)Drain Green hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(10)Disconnect isolation coupling of Power Transfer Unit (PTU) (Ref. 29-22-11, P. Block 401), (Ref. 29-23-11, P. Block 401).

B. Removal
(Ref. Fig. 401)
(1)Disconnect electrical connectors (62) (10) (17) (46).
(2)Put blanking caps on disconnected electrical connectors (10) (46) (62) (17).
(3)Loosen pipe end-fitting (56) and disconnect pipe (55) from union (57).
(4)Loosen pipe end-fitting (59) and disconnect pipe (60) from elbow union (58).
(5)Loosen pipe end-fitting (13) and disconnect pipe (12) from elbow union (14).
(6)Loosen pipe end-fitting (20) and disconnect pipe (21) from elbow union (19).
(7)Loosen pipe end-fitting (23) and disconnect pipe (24) from elbow union (22).
(8)Loosen pipe end-fitting (40) and disconnect pipe (39) from union (41).
(9)Loosen pipe end-fitting (42) and disconnect pipe (43) from elbow union (47).
(10)Hold manifold (14) and remove bolts (16), washers (15). Remove manifold (11).
(11)Install blanking plugs on disconnected line ends and manifold ports.

C. Preparation of Replacement Component
CAUTION : WHEN REMOVING THE BOBBINS, GREAT CARE SHOULD BE TAKEN NOT TO DAMAGE THEM. IT IS RECOMMENDED TO USE SPECIAL TOOL 97A29102090000.
(1)Remove parts which are attached to removed HP manifold (11).
(a)Remove HP filter (27).
1 Cut, remove and discard lockwire.
2 Remove bolts (26), washers (25) and remove HP filter.
R 3 Remove and discard seals (31), packings (28) and O-rings (29) from
R bobbins (30) (Ref. 20-23-21, P. Block 1).



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Green HP Manifold
Figure 401

R

(b)Remove priority valve (3).
1 Cut, remove and discard lockwire.
2 Remove bolts (1), washers (2) and remove priority valve.
R 3 Remove and discard seals (4), packings (7) and O-rings (5) from
R bobbins (6) (Ref. 20-23-21, P. Block 1).
(c)Remove pressure switch (18) and retain packing (69).
(d)Remove pressure switch (45) and retain packing (44).
(e)Remove relief valve assy (52).
1 Cut, remove and discard lockwire.
2 Remove bolts (54), washers (53) and remove relief valve assy.
R 3 Remove and discard seals (48), packings (51) and O-rings (49) from
R bobbins (50) (Ref. 20-23-21, P. Block 1).
(f)Remove brake selector valve (61).
1 Cut, remove and discard lockwire.
2 Remove bolts (63), washers (64) and remove brake selector valve.
R 3 Remove and discard seals (68), packings (65) and O-rings (66) from
R bobbins (67) (Ref. 20-23-21, P. Block 1).
(g)Remove hydraulic pressure transmitter (8).
1 Cut, remove and discard lockwire.
2 Remove bolts (9), washers (70) and remove hydraulic pressure transmitter.
(h)Remove HP filter (38) as follows :
1 Cut, remove and discard lockwire.
2 Remove bolts (37), washers (36) and remove HP filter.
R 3 Remove and discard seals (32), packings (35) and O-rings (33) from
R bobbins (34) (Ref. 20-23-21, P. Block 1).
(j)Put bobbins (6) (30) (34) (50) (67) into plastic bags to keep then clean.
(k)Install blanking plugs in open ports of all removed components.
(l)Remove union (57) from manifold (11) and discard O-ring.
(m)Remove elbow union (58) from manifold (11) and discard O-ring.
(n)Remove elbow union (14) from manifold (11) and discard O-ring.
(p)Remove elbow union (19) from manifold (11) and discard O-ring.
(q)Remove elbow union (22) from manifold (11) and discard O-ring.
(r)Remove union (41) from manifold (11) and discard O-ring.
(s)Remove elbow union (47) from manifold (11) and discard O-ring.
(2)Install removed parts on replacement manifold (11).
(Ref. Fig. 401).
(a)Remove blanking plugs from manifold (11) and components.
(b)Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.
(c)Put O-ring in position on union (57).
Install and tighten union (57) on manifold (11).
(d)Put O-ring in position on union (41).
Install and tighten union (41).
R NOTE : Make sure that you install the square-section seal on the end of
R the bobbin without the identification groove.
R NOTE : Make sure that you install the bobbins so that
R the identification groove is in the manifold.
(e)Put O-ring in position on elbow union (58).
Install and tighten elbow union (58).
(f)Put O-ring in position on elbow union (14).

Install and tighten elbow union (14).
(g)Put O-ring in position on elbow union (19).
Install and tighten elbow union (19).
(h)Put O-ring in position on elbow union (22).
Install and tighten elbow union (22).
(j)Put O-ring in position on elbow union (47).
Install and tighten elbow union (47).
(k)Install HP filter (27).
R 1 Put new seals (31), packings (28) and O-rings (29) in position on
R bobbins (30).
R 2 Install bobbins (30) in ports of manifold (11) (Ref. 20-23-21,
R P. Block 1).
3 Install HP filter (27). Install bolts (26) and washers (25).
Tighten bolts (26) and safety with lockwire.
(l)Install priority valve (3).
R 1 Put new seals (4), packings (7) and O-rings (5) in position on
R bobbins (6).
R 2 Install bobbins (6) in ports of manifold (11) (Ref. 20-23-21,
R P. Block 1).
3 Install priority valve (3). Install bolts (1) and washers (2).
Tighten bolts (1) and safety with lockwire.
(m)Install packing (44) and connect pressure switch (45).
(n)Install packing (69) and connect pressure switch (18).
(p)Install relief valve assy (52).
R 1 Put new seals (48), packings (51) and O-rings (49) in position on
R bobbins (50).
R 2 Install bobbins (50) in ports of manifold (11) (Ref. 20-23-21,
R P. Block 1).
3 Install relief valve assy. Install bolts (54) and washers (53).
Tighten bolts and safety with lockwire.
(q)Install brake selector valve (61).
R 1 Put new seals (68), packings (65) and O-rings (66) in position on
R bobbins (67).
R 2 Install bobbins (67) in ports of manifold (11) (Ref. 20-23-21,
R P. Block 1).
3 Install brake selector valve. Install bolts (63) and washers (64).
Tighten bolts (63) and safety with lockwire.
(r)Install HP filter (38).
R 1 Put new seals (32), packings (35) and O-rings (33) in position on
R bobbins (34).
R 2 Install bobbins (34) in ports of manifold (11) (Ref. 20-23-21,
R P. Block 1).
3 Install HP filter (38). Install bolts (37) and washers (36).
Tighten bolts (37) and safety with lockwire.
(s)Install pressure transmitter (8). Install bolts (9) and washers (70).
Tighten bolts (9) and safety with lockwire.

D. Installation
(Ref. Fig. 401)
(1)Remove sealant from contact surface of manifold (11) and aircraft
structure with a plastic or wooden scraper.

(2)Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.
(3)Put manifold (11) in position on aircraft.
(a)Install bolts (16) and washers (15).
(b)Install bolts (16). Tighten bolts (16) with lockwire.
(4)Apply a layer of SEALANTS (Material No. 09-018) to contact surface of manifold (11).
(5)Remove blanking plugs from pipe connections.
(6)Connect pipe (60) to elbow union (58). Install pipe end-fitting (59).
(7)Connect pipe (12) to elbow union (14). Install pipe end-fitting (13).
(8)Connect pipe (21) to elbow union (19). Install pipe end-fitting (20).
(9)Connect pipe (24) to elbow union (22). Install pipe end-fitting (23).
(10)Connect pipe (43) to elbow union (47). Install pipe end-fitting (42).
(11)Connect pipe (55) to union (57). Install pipe end-fitting (56).
(12)Connect pipe (39) to union (41). Install pipe end-fitting (40).
(13)Connect electrical connectors (62) (46) (10) (17) to the receptacles on manifold (11).

E. Tests
(1)Remove safety clips and tags and close these circuit breakers : 1GQ, 1GR, 1GL, 6GL and 4GE.
(2)Make certain that fluid level in Green hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Pressurize Green hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Visually check for hydraulic fluid leakage at the various line connections.
R (5)Check that quantity transmitter direct reading gage and quantity indicator in flight compartment read same indication.
R (6)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
R (7)Check the pumps delivery relief valve (53) (Ref. 29-11-55, P. Block 601).
R (8)Carry out a normal braking operational test (Ref. 32-42-00, P. Block 501).
R (9)Carry out an operational test of the hydraulic actuation and power transmission (flaps) (Ref. 27-54-00, P. Block 501).
R (10)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).

F. Close-up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

RESERVOIR RETURN FILTER - SERVICING

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING THE HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Reason for the Job
Replacement of Filter Element.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Compressed Air Cylinder
B.	Torque Wrench
C.	Access Platform, 2.60 m (8 ft. 8 in.)
D. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00, P. Block 1)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure

A. Job Set-Up
(1)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(2)Position access platform.
(3)Open hydraulic ground connector access doors 147AL, 571DB and 671DB.
(4)In flight compartment, on HYD PWR panel 427VU, make certain that hydraulic power is in the following configuration.
(a)ELEC PUMPS pushbutton switch released (out).
(b)Green/Blue and Green/Yellow PTU pushbutton switches released (out).
(c)PUMPS ENG1 and PUMPS ENG2 pushbutton switches released (out).
(5)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
101VU	ELEC/HYD/PUMP	23GX	GEN2/B8

(6)Depressurize Green, Blue and Yellow hydraulic system reservoirs (Ref. 29-

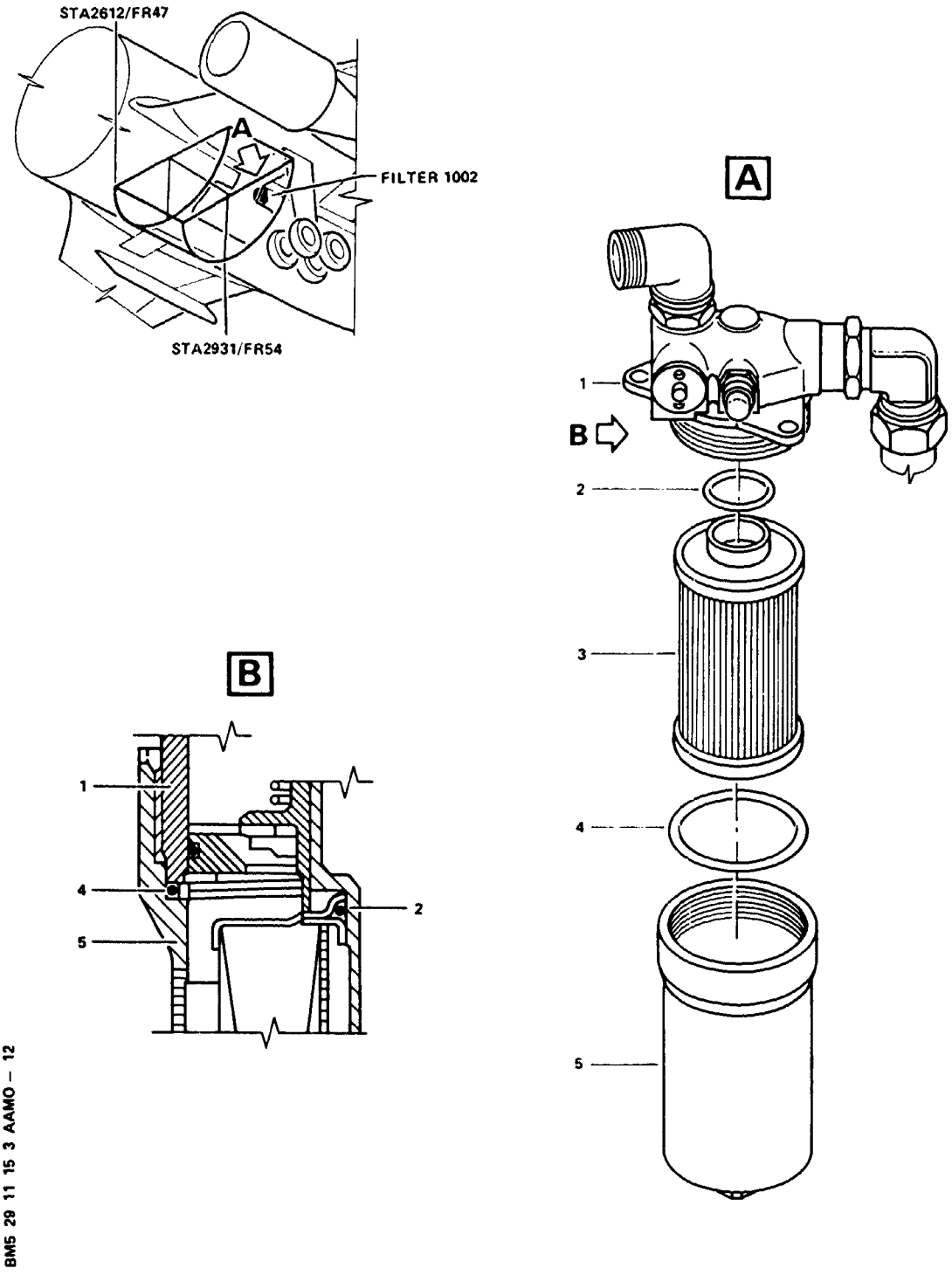
14-00, P. Block 301).
(7)Install warning notices on ground connectors prohibiting pressurization of Green, Blue and Yellow hydraulic systems.
(8)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(9)Install warning notice on hand pump 293085 prohibiting its operation.

B. Removal (Ref. Fig. 301, 302, 303)
(1)Cut and remove lockwire between filter head (1) and bowl (5).
(2)Unscrew bowl (5).
(3)Discard O-ring (4).
(4)Remove filter element (3) from bowl (5) and discard O-ring (2).

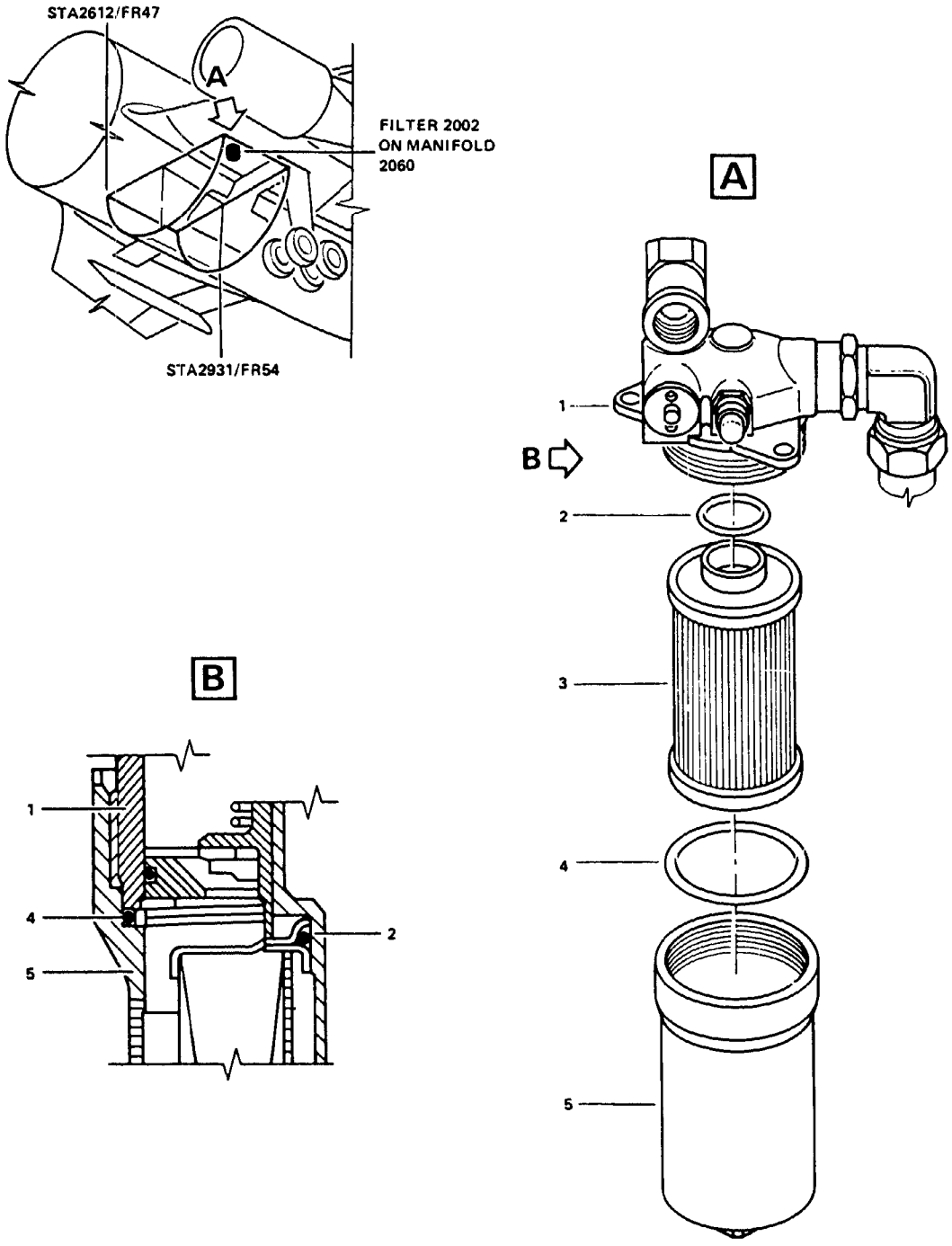
C. Installation
(1)Install new O-ring (4) on bowl (5) and new O-ring (2) on filter element. O-rings must be previously coated with hydraulic fluid. Material No. 02-003 (Ref. 20-31-00, P. Block 1)
(2)Position filter element (3) in bowl.
(3)Position bowl-filter element assembly under filter head (1).
(4)Tighten home bowl. Maximum TORQUE : 5 m.daN (35 lbf.ft.).
(5)Wirelock bowl.
(6)Press clogging indicator if protruding.

D. Tests
(1)Disconnect depressurizing equipment.
(2)Remove warning notices.
(3)Close circuit breakers 4GE, 7GX, 1GL, 6GL 2GB and 23GX.
(4)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(5)Check hydraulic fluid level in reservoirs, top up if necessary (Ref. 12-12-29, P. Block 1).
(6)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(7)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(8)On filters 1002, 2002 and 3002 check that :
- there is no hydraulic leakage,
- clogging indicator is not protruding.

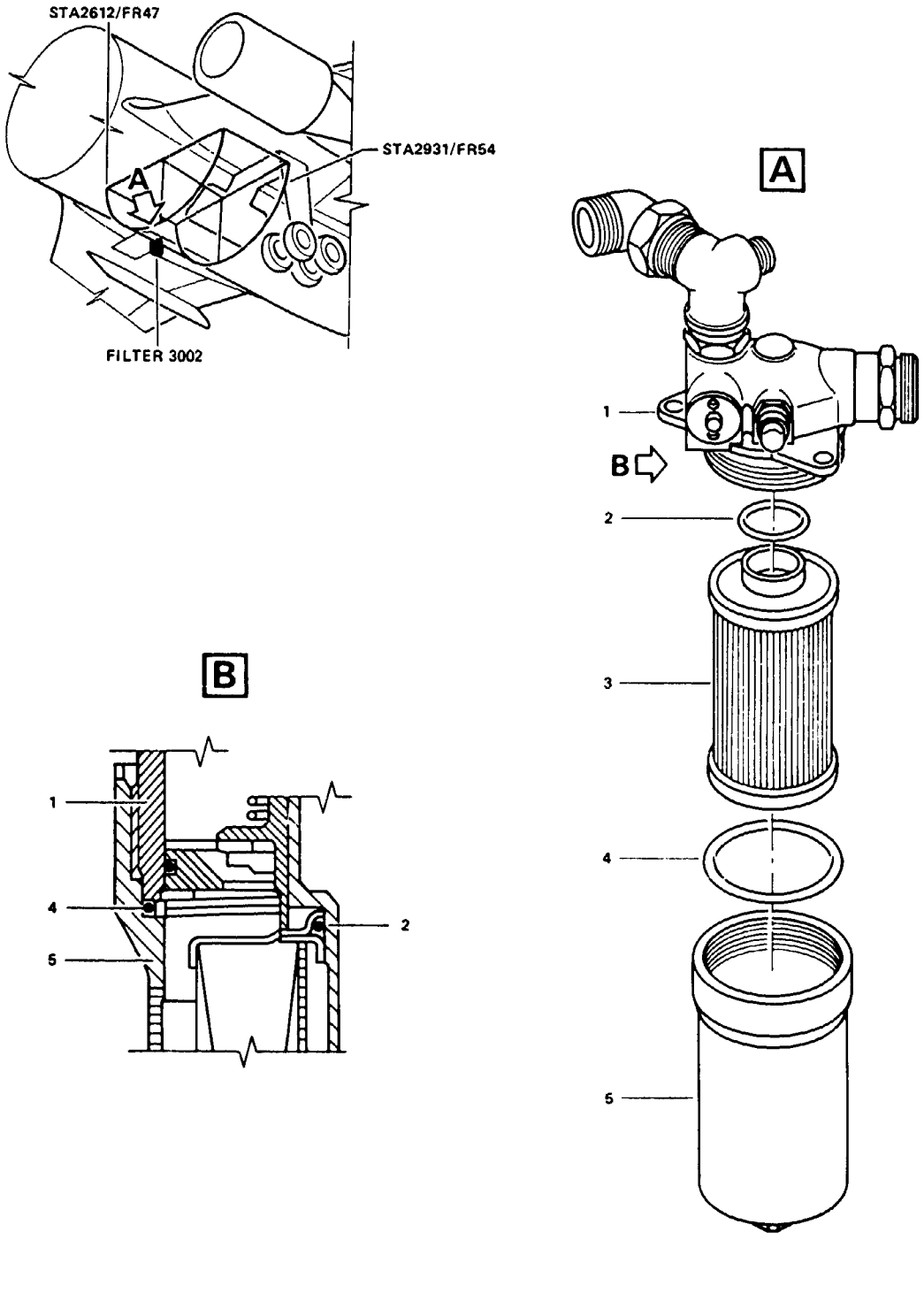
E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access doors.
(3)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(4)Close main gear main doors (Ref. 32-12-11, P. Block 301).



Filter 291002 - Replacement of Element
Figure 301



Filter 292002 - Replacement of Element
Figure 302



Filter 3002 - Replacement of Element
Figure 303

MANIFOLD - LP, GREEN
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Plugs
(2)	Circuit Breaker(s) Safety Clip(s)
(3)	Container
(4)	Warning Notices
(5)	Access Platform 2.6 m (8 ft. 8 in.)
(6)	Lockwire
(7)	Plastic or Wooden Scraper
(8)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
(9)Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 20-23-12, P. Block 1	Specified Torque Values for Unions
- 20-28-11, P. Block 1	Electrical Bonding
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 29-00-00, P. Block 301	General Servicing
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-22-11, P. Block 401	Green/Blue Power Transfer Unit
- 29-23-11, P. Block 401	Green/Yellow Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

2. Procedure

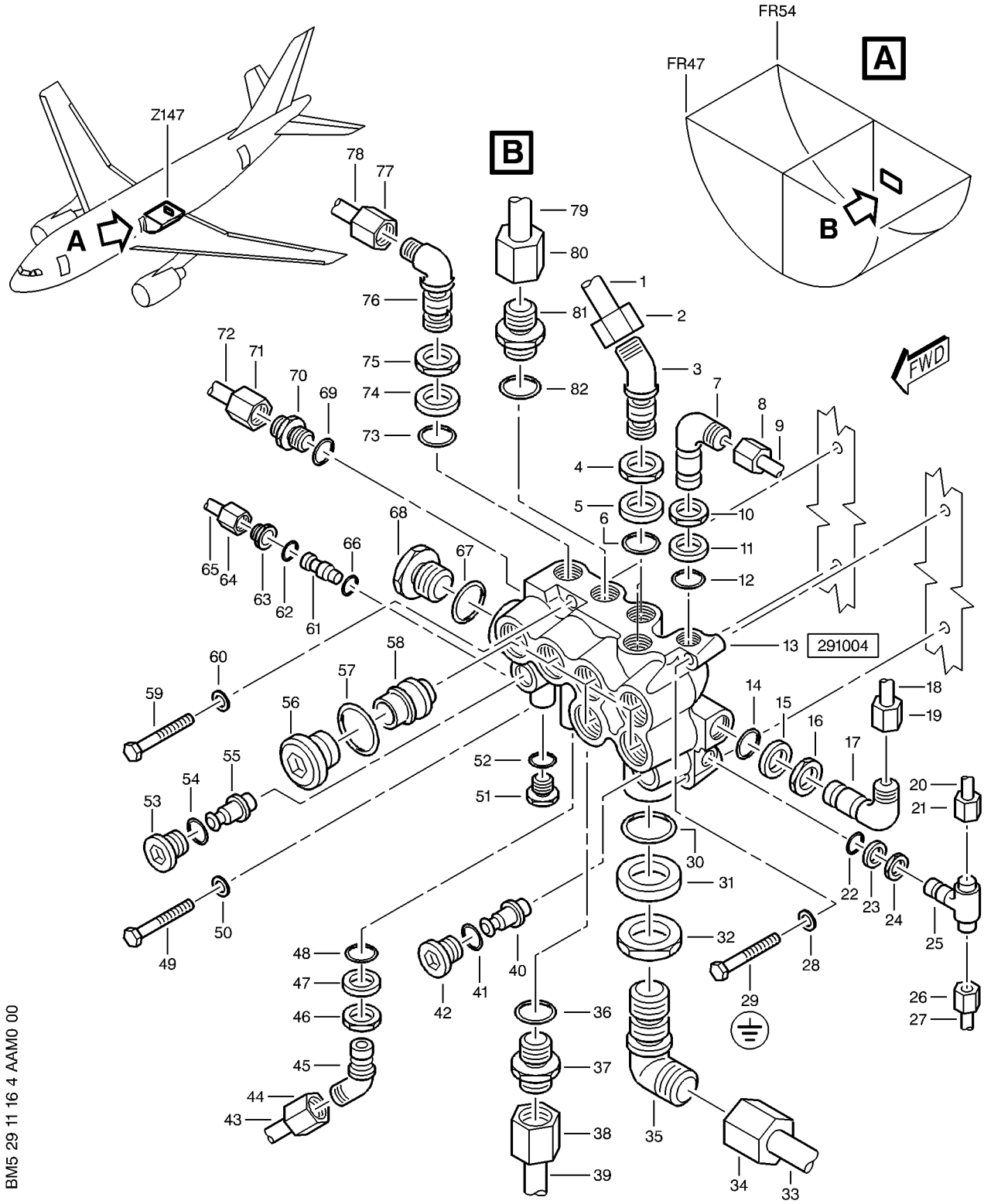
A. Job Set-Up
(1)On overhead panel 427VU in flight compartment :
(a)Make certain that Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).
(b)Display a warning notice prohibiting pressurization and use of Green hydraulic system.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	801/V60

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Install access platform at zone 147.
(6)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(7)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Place container under reservoir to be drained and place absorbent material around unions.
(9)Drain Green hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(10)Disconnect isolation coupling from Power Transfer Unit (PTU) (Ref. 29-22-11, P. Block 401), (Ref. 29-23-11, P. Block 401).

B. Removal
(Ref. Fig. 401)
(1)Loosen pipe end-fittings (2) and disconnect pipes (1) from elbow unions (3).
(2)Loosen pipe end-fitting (8) and disconnect pipe (9) from elbow union (7).
(3)Loosen pipe end-fitting (19) and disconnect pipe (18) from elbow union (17).
(4)Loosen pipe end-fitting (21) and disconnect pipe (20) from tee union (25).
(5)Loosen pipe end-fitting (26) and disconnect pipe (27) from tee union (25).
(6)Loosen pipe end-fitting (34) and disconnect pipe (33) from elbow union (35).
(7)Loosen pipe end-fitting (38) and disconnect pipe (39) from union (37).
(8)Loosen pipe end-fitting (44) and disconnect pipe (43) from elbow union (45).
(9)Loosen pipe end-fitting (64) and disconnect pipe (65) from union (63).
(10)Loosen pipe end-fitting (71) and disconnect pipe (72) from union (70).
(11)Loosen pipe end-fitting (77) and disconnect pipe (78) from elbow union (76).
(12)Loosen pipe end-fitting (80) and disconnect pipe (79) from union (81).
(13)Remove the two bolts (29) and the two washers (28).
(14)Hold manifold (13), remove bolts (49), (59) and washers (50) and (60).
(15)Remove manifold (13) from support plate.
(16)Install blanking plugs on disconnected line ends.

C. Preparation of Replacement Component
(1)Remove parts which are attached to removed LP manifold (13).
NOTE : Put non-return valves, unions and plugs into plastic bags to keep them clean.
(a)Cut, remove and discard lockwire from manifold (13).



Green LP Manifold
Figure 401

(b)Remove elbow unions (3) and nuts (4) from manifold (13) and discard packings (5) and (6).
(c)Remove elbow union (7) and nut (10) from manifold (13) and discard packings (11) and (12).
(d)Remove elbow union (17) and nut (16) from manifold (13) and discard packings (14) and (15).
(e)Remove tee union (25) and nut (24) from manifold (13) and discard packings (22) and (23).
(f)Remove elbow union (35) and nut (32) from manifold (13) and discard packings (30) and (31).
(g)Remove union (37) from manifold (13) and discard O-ring (36).
(h)Remove elbow union (45) and nut (46) from manifold (13) and discard packings (47) and (48).
(j)Remove union (63) from manifold (13) and discard O-ring (62).
(k)Remove non-return valve (61) from manifold (13) and discard O-ring (66).
(l)Remove union (70) from manifold (13) and discard O-ring (69).
(m)Remove elbow union (76) and nut (75) from manifold (13) and discard packings (73) and (74).
(n)Remove union (81) from manifold (13) and discard O-ring (82).
(p)Remove extractor plug (42) from manifold (13) and discard O-ring (41).
(q)Remove non-return valve (40) from manifold (13).
(r)Remove extractor plug (53) from manifold (13) and discard O-ring (54).
(s)Remove non-return valve (55) from manifold (13).
(t)Remove extractor plugs (56) from manifold (13) and discard O-rings (57).
(u)Remove non-return valves (58) from manifold (13).
(v)Remove bleed plug (51) from manifold (13) and discard O-ring (52).
(w)Remove bleed plug (68) from manifold (13) and discard O-ring (67).
(x)Install blanking plugs on manifold ports.

(2)Install removed parts on replacement manifold (13). (Ref. Fig. 401).
(a)Remove blanking plugs from manifold (13).
(b)Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.
(c)Put new packings (5) and (6) in position on elbow unions (3), install and tighten elbow unions (3) and nuts (4) on manifold (13). TORQUE elbow unions (3) and nuts (4) to between 11.64 and 11.86 m.daN (1030 and 1050 lbf.in) (Ref. 20-23-12, P. Block 1).
(d)Put new packings (11) and (12) in position on elbow union (7), install and tighten elbow union (7) and nut (10) on manifold (13). TORQUE elbow union (7) and nut (10) to between 5.03 and 5.14 m.daN (445 and 455 lbf.in) (Ref. 20-23-12, P. Block 1).
(e)Put new packings (14) and (15) in position on elbow union (17), install and tighten elbow union (17) and nut (16) on manifold (13). TORQUE elbow union (17) and nut (16) to between 7.29 and 7.40 m.daN (645 and 655 lbf.in) (Ref. 20-23-12, P. Block 1).
(f)Put new packings (22) and (23) in position on tee union (25), install and tighten tee union (25) and nut (24) on manifold (13). TORQUE tee union (25) and nut (24) to between 1.63 and 1.75 m.daN (144 and 155 lbf.in) (Ref. 20-23-12, P. Block 1).
(g)Put new packings (30) and (31) in position on elbow union (35), install

and tighten elbow union (35) and nut (32) on manifold (13).
TORQUE elbow union (35) and nut (32) to between 14.10 and 14.30 m.daN (1248 and 1266 lbf.in) (Ref. 20-23-12, P. Block 1).

(h)Put new O-ring (36) in position on union (37), install and tighten union (37) on manifold (13).
TORQUE union (37) to between 7.29 and 7.40 m.daN (645 and 655 lbf.in) (Ref. 20-23-12, P. Block 1).

(j)Put new packings (47) and (48) in position on elbow union (45), install and tighten elbow union (45) and nut (46) on manifold (13).
TORQUE elbow union (45) and nut (46) to between 7.29 and 7.40 m.daN (645 and 655 lbf.in) (Ref. 20-23-12, P. Block 1).

(k)Put new O-rings (62) and (66) in position on non-return valve (61) and install non-return valve (61) on manifold (13).

(l)Install and tighten union (63) on manifold (13).
TORQUE union (63) to between 1.21 and 1.32 m.daN (107 and 117 lbf.in) (Ref. 20-23-12, P. Block 1).

(m)Put new O-ring (69) in position on union (70), install and tighten union (70) on manifold (13).
TORQUE union (70) to between 1.21 and 1.32 m.daN (107 and 117 lbf.in) (Ref. 20-23-12, P. Block 1).

(n)Put new packings (73) and (74) in position on elbow union (76), install and tighten elbow union (76) and nut (75) on manifold (13).
TORQUE elbow union (76) and nut (75) to between 11.64 and 11.86 m.daN (1030 and 1050 lbf.in) (Ref. 20-23-12, P. Block 1).

(p)Put new O-ring (82) in position on union (81), install and tighten union (81) on manifold (13).
TORQUE union (81) to between 11.64 and 11.86 m.daN (1030 and 1050 lbf.in) (Ref. 20-23-12, P. Block 1).

R (q)Installation of non-return valve (40).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE
R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-ring (41) in position on extractor plug (42).
R 2 Install extractor plug (42) on non-return valve (40).
R 3 Install non-return valve/extractor plug assembly on manifold (13).
R 4 TORQUE extractor plug (42) to between 7.3 and 7.4 m.daN (645 and 655 lbf.in.) (Ref. 20-23-12, P. Block 1).

R (r)Installation of non-return valve (55).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE
R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-ring (54) in position on extractor plug (53).
R 2 Install extractor plug (53) on non-return valve (55).
R 3 Install non-return valve/extractor plug assembly on manifold (13).
R 4 TORQUE extractor plug (53) to between 7.3 and 7.4 m.daN (645 and 655 lbf.in.) (Ref. 20-23-12, P. Block 1).

R (s)Installation of non-return valves (58).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE

R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-rings (57) in position on extractor plugs (56).
R 2 Install extractor plugs (56) on non-return valves (58).
R 3 Install non-return valve/extractor plug assemblies on manifold (13).
R 4 TORQUE extractor plugs (56) to between 9.7 and 10.7 m.daN (859 and
R 947 lbf.in.) (Ref. 20-23-12, P. Block 1).

R (t) Put new O-ring (52) in position on bleed plug (51), install and tighten bleed plug (51) on manifold (13).
TORQUE bleed plug (51) to between 1.63 and 1.75 m.daN (144 and 155 lbf.in) (Ref. 20-23-12, P. Block 1).

R (u) Put new O-ring (67) in position on bleed plug (68), install and tighten bleed plug (68) on manifold (13).
TORQUE bleed plug (68) to between 14.10 and 14.30 m.daN (1248 and 1266 lbf.in) (Ref. 20-23-12, P. Block 1).

R (v) Safety non-return valves with lockwire.

D. Installation
(Ref. Fig. 401)

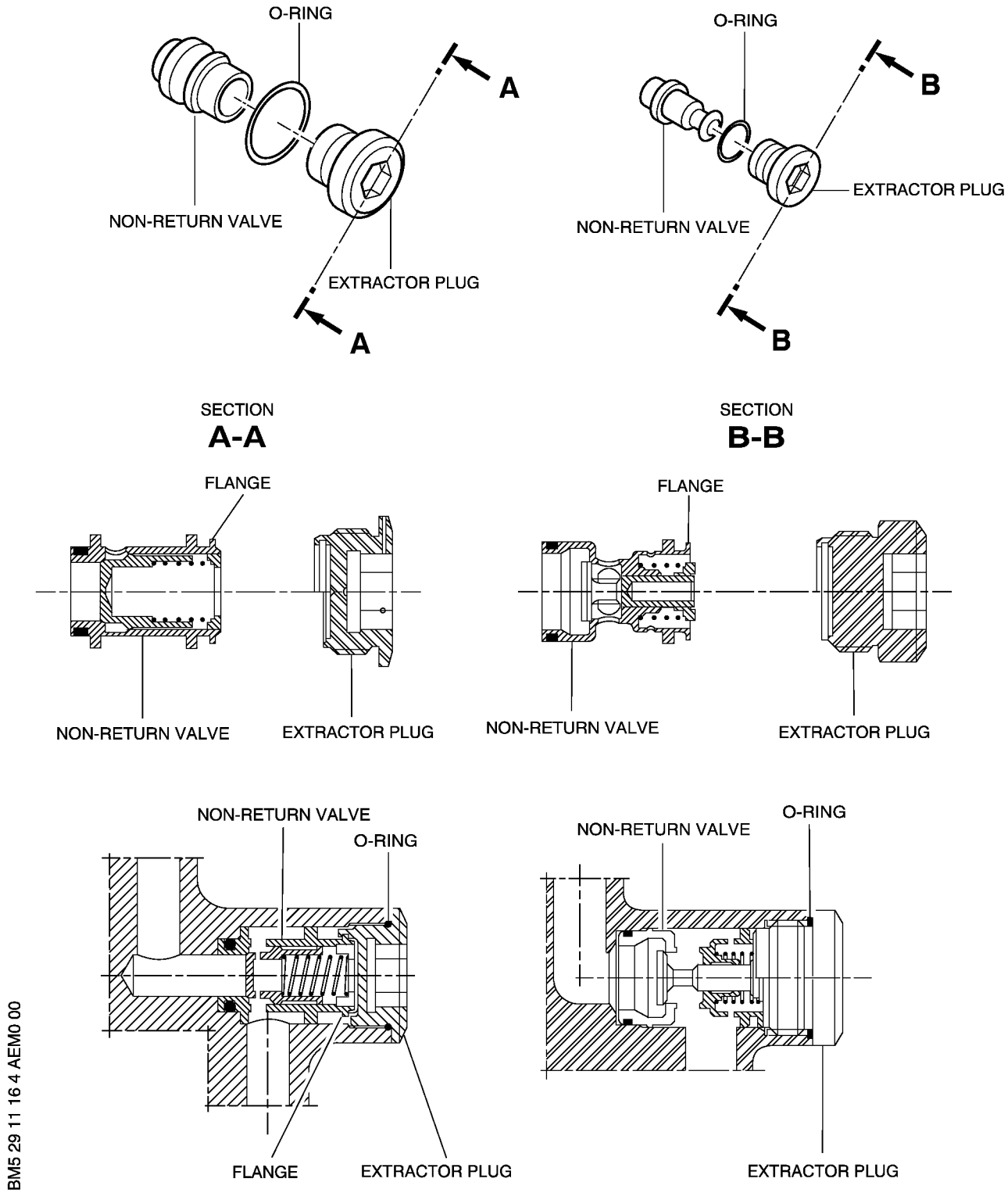
(1) Remove sealants from contact surface manifold (13) and aircraft structure with a plastic or wooden scraper.
(2) Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.
(3) Put manifold (13) in position on aircraft.
(4) Install bolts (29), (49), (59) and washers (28), (50) and (60). Tighten bolts (29), (49) and (59).
(5) Apply a layer of SEALANTS (Material No. 09-018) to contact surface of manifold (13).
(6) Make certain that electrical bonding is correct (Ref. 20-28-11, P. Block 1).
(7) Remove blanking plugs from pipe connections.
(8) Connect pipes (1) to elbow unions (3). Install and tighten pipe end-fittings (2).
TORQUE pipe end-fittings (2) to between 9.7 and 10.7 m.daN (859 and 947 lbf.in) (Ref. 20-23-12, P. Block 1).
(9) Connect pipe (9) to elbow union (7). Install and tighten pipe end-fitting (8).
TORQUE pipe end-fitting (8) to between 4.8 and 5.3 m.daN (425 and 469 lbf.in) (Ref. 20-23-12, P. Block 1).
(10) Connect pipe (18) to elbow union (17). Install and tighten pipe end-fitting (19).
TORQUE pipe end-fitting (19) to between 1.8 and 2.0 m.daN (159 and 177 lbf.in) (Ref. 20-23-12, P. Block 1).
(11) Connect pipe (20) to tee union (25). Install and tighten pipe end-fitting (21).
TORQUE pipe end-fitting (21) to between 4.8 and 5.3 m.daN (425 and 469 lbf.in) (Ref. 20-23-12, P. Block 1).
(12) Connect pipe (27) to tee union (25). Install and tighten pipe end-fitting (26).
TORQUE pipe end-fitting (26) to between 1.2 and 1.3 m.daN (106 and 115 lbf.in) (Ref. 20-23-12, P. Block 1).

(13)Connect pipe (33) to elbow union (35). Install and tighten pipe end-fitting (34).
TORQUE pipe end-fitting (34) to between 1.2 and 1.3 m.daN (106 and 115 lbf.in) (Ref. 20-23-12, P. Block 1).
(14)Connect pipe (39) to union (37). Install and tighten pipe end-fitting (38).
TORQUE pipe end-fitting (38) to between 8.1 and 8.9 m.daN (717 and 788 lbf.in) (Ref. 20-23-12, P. Block 1).
(15)Connect pipe (43) to elbow union (45). Install and tighten pipe end-fitting (44).
TORQUE pipe end-fitting (44) to between 3.9 and 4.3 m.daN (345 and 381 lbf.in) (Ref. 20-23-12, P. Block 1).
(16)Connect pipe (65) to union (63). Install and tighten pipe end-fitting (64).
TORQUE pipe end-fitting (64) to between 4.8 and 5.3 m.daN (425 and 469 lbf.in) (Ref. 20-23-12, P. Block 1).
(17)Connect pipe (72) to union (70). Install and tighten pipe end-fitting (71).
TORQUE pipe end-fitting (71) to between 4.8 and 5.3 m.daN (425 and 469 lbf.in) (Ref. 20-23-12, P. Block 1).
(18)Connect pipe (78) to elbow union (76). Install and tighten pipe end-fitting (77).
TORQUE pipe end-fitting (77) to between 1.8 and 2.0 m.daN (159 and 177 lbf.in) (Ref. 20-23-12, P. Block 1).
(19)Connect pipe (79) to union (81). Install and tighten pipe end-fitting (80).
TORQUE pipe end-fitting (80) to between 1.8 and 2.0 m.daN (159 and 177 lbf.in) (Ref. 20-23-12, P. Block 1).

E. Tests
(1)Remove safety clips and tags and close these circuit breakers : 1GQ, 1GR, 1GL, 6GL and 4GE.
(2)Make certain that fluid level in Green hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Pressurize Green hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Visually check for hydraulic fluid leakage at the various line connections.
(5)Check for air leakage, using soapy water and direct-reading pressure gage.
(6)Check that quantity transmitter direct-reading gage and quantity indicator in flight compartment read same indication.
(7)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

F. Close-up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00,

P. Block 301).



Typical Non-Return Valve and Extractor Plug Installation
Figure 402

R

VALVE-DEPRESSURIZATION/RELIEF (291005) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Blanking Plugs
C.	Circuit Breaker Safety Clips
D.	Warning Notices
E. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Reservoir Replenishing
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)On panel 427VU,
- display a warning notice prohibiting pressurization and use of Green hydraulic system.
(2)Open, safety and tag the following circuit breakers :

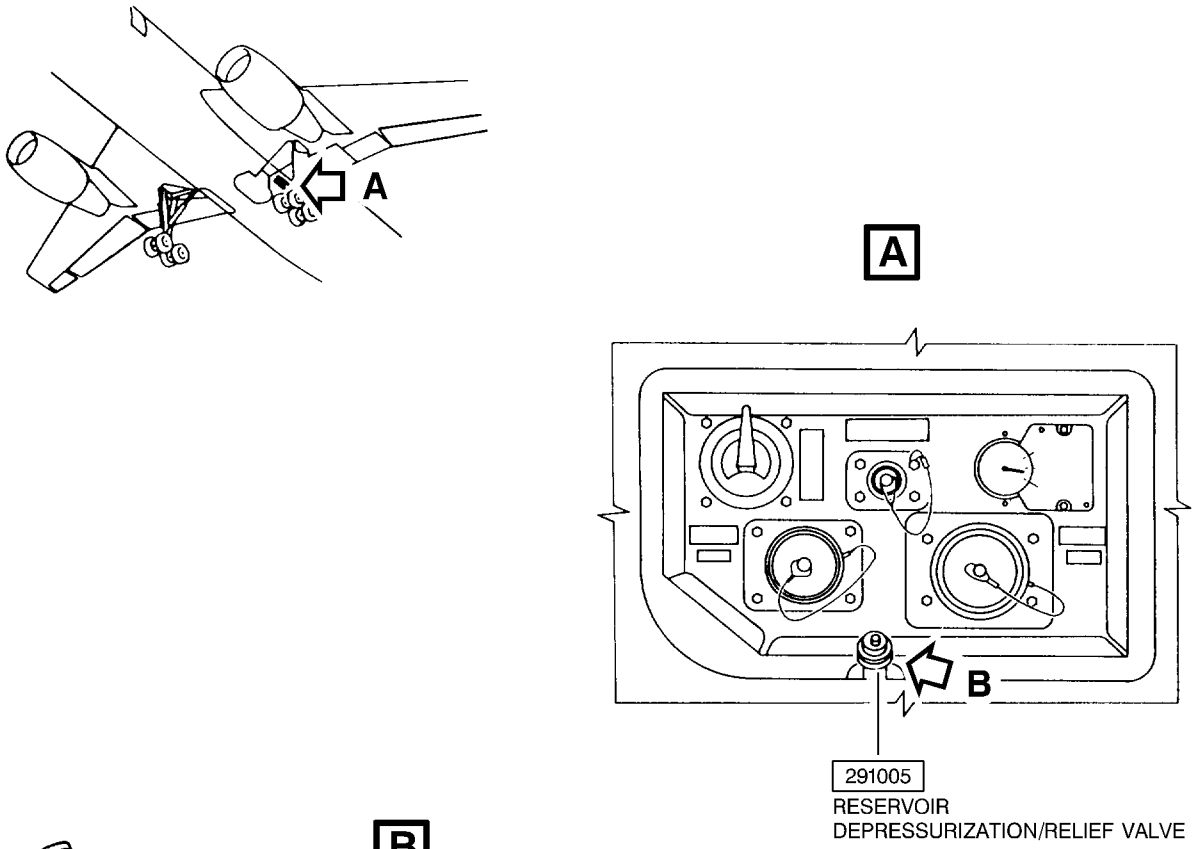
PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B 8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL&/CARGO DOOR/PUMP	7GX	333/T51

(3)Install access platform at zone 147.
(4)Open access door 147AL.
(5)Display a warning notice on ground connectors prohibiting pressurization and use of Green hydraulic system.
(6)Open main gear doors (Ref. 32-12-11, P. Block 301).
(7)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

B. Removal
(1)Disconnect line from elbow union (2) from inner side of aircraft structure (1).
(2)Put blanking plug on disconnected line end.
(3)Remove three screws (7) and washers (6).
(4)Remove valve (5).
(5)Remove elbow union (2) and discard packing (4) and packing washer (3).
(6)Put blanking plug in port of valve (5).

C. Preparation of Replacement Component
(1)Make certain that the parts retained from the removed component are clean and in correct condition.
(2)Remove blanking plug from port of valve (5).
(3)Install a new packing (4) and a new packing washer (3) on elbow union (2) and install elbow union (2) on port of valve (5).

D. Installation
(1)Clean and inspect component interface and/or component adjacent area.
(2)Remove plug from disconnected line end.
(3)Install valve (5).
NOTE : Do not forget to attach chain (8) when installing washers (6) and screws (7).
(4)Install washers (6) and screws (7) and tighten.
(5)Apply Hydraulic Fluid (Material No. 02-003) to elbow union (2) threads.
(6)Connect line to elbow union (2).



Green Reservoir Depressurization/Relief Valve
Figure 401

E. Test
(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 1GL, 6GL and 7GX.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics rack ventilation is correct.
(3)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(5)Check for leakage at valve (5) using soapy water.
(6)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door.
(3)Close main gear doors (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

NOTE : When replacing a damaged hydraulic pump, or a hydrualic pump that you suspect is damaged, replace the gearbox carbon seal before the replacement hydraulic pump is installed (Ref. 72-65-08, P. Block 401).

NOTE : A damaged pump may be suspected if, when removed, a large quantity of hydraulic fluid is found trapped within the drain cavity and or if other evidence of gearbox carbon seal breach is noted. Other evidence of a carbon seal breach can include hydraulic fluid found in the gearbox, obvious hydraulic pump shaft misalignment, or unusual shaft wear patterns on the gearbox carbon seal.

1. Engine Pumps

A. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Blanking Plugs/Caps
	(2)	Circuit Breaker Safety Clips
	(3)	Container
	(4)	Warning Notice
R	(5)	Snapwire, 0.3 or 0.4 mm (0.012 or 0.015 in.)
R		with breaking strength 2.0 to 3.5 daN
R		(4.5 to 7.9 lbf)
R	(6)Material No.P02-001	Hydraulic Fluids (Ref. 70-00-00)
R	(7)Material No.P03-001	Oils (Ref. 70-00-00)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 12-36-29, P. Block 1	Hydraulics
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-00-00, P. Block 301	General - Servicing
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
	- 71-00-00, P. Block 501	Power Plant - General
	- 71-13-00, P. Block 301	Cowl Doors
	- 72-65-08, P. Block 401	Hydraulic Pump Front Drive Oil Seal Assembly

B. Procedure

(1)Job set-up

(a)Make sure that the check of the Green, Blue and Yellow hydraulic systems after operation of the engine pumps in possible starvation

or cavitation condition has been done if necessary (Ref. 29-00-00, P. Block 301).

(b)Open, safety and tag the following circuit breakers associated with pump to be removed

PANEL	SERVICE	IDENT.	LOCATION
	Engine 1 Green Pump		
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
	Engine 2 Green Pump		
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
	Engine 1 Blue Pump		
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	PTU CTL/G/B	1GL	332/U59
	Engine 2 Yellow Pump		
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	PTU CTL/G/Y	6GL	332/U60

(c)Depressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).

(d)Depressurize associated system reservoir (Ref. 29-14-00, P. Block 301).

(e)Display a warning notice on panel 427VU prohibiting operation of the sytem associated with the pump to be removed.

(f)Open engine cowls (Ref. 71-13-00, P. Block 301).

1 Open door 435AL or 445AL to gain access to green pump.

2 Open door 436AR to gain access to blue pump.

3 Open door 446AR to gain access to yellow pump.

(g)Place container under pump and lines to be removed.

(2)Removal

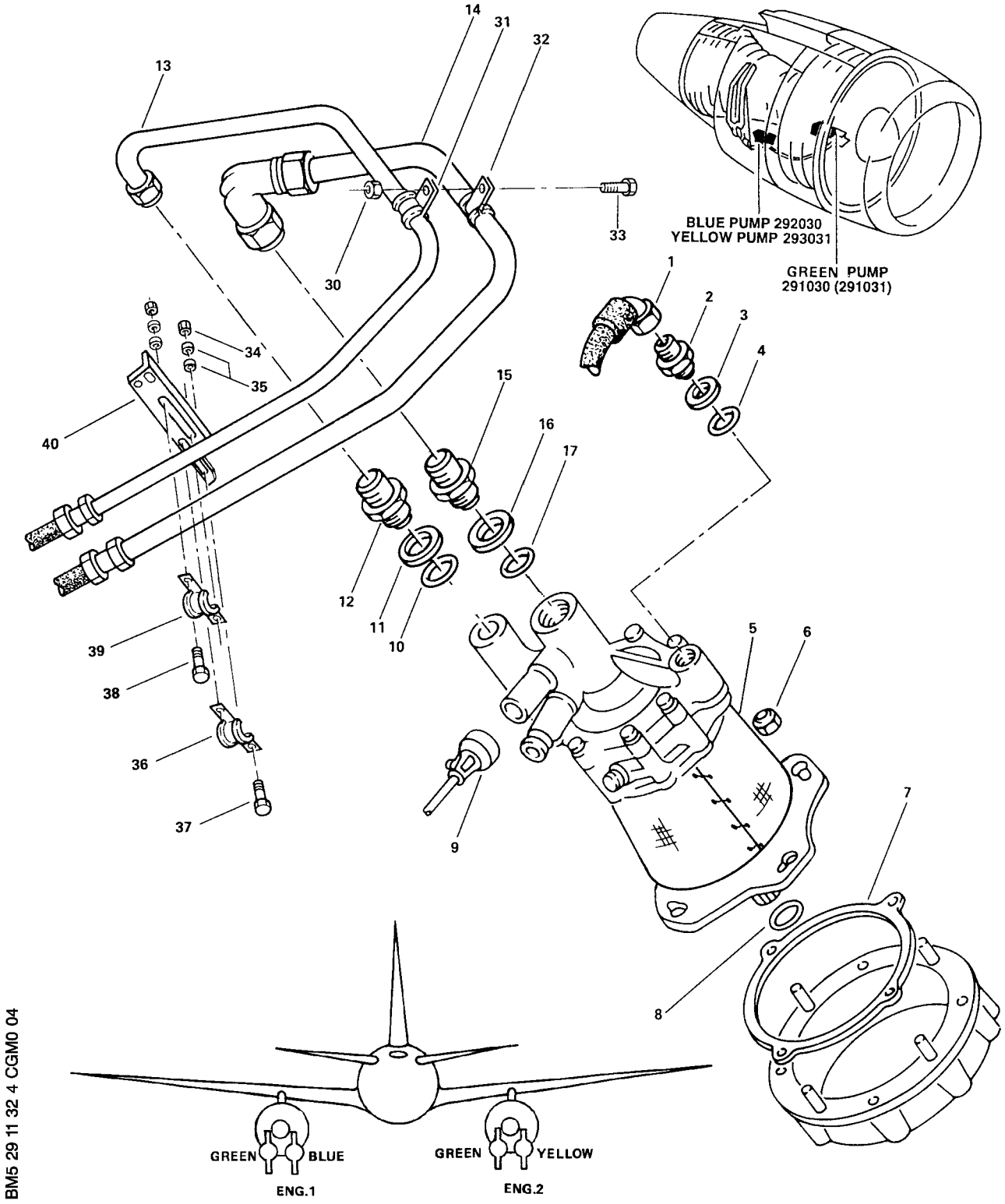
(Ref. Fig. 401)

(Ref. Fig. 402)

(a)Blue pump and Yellow pump

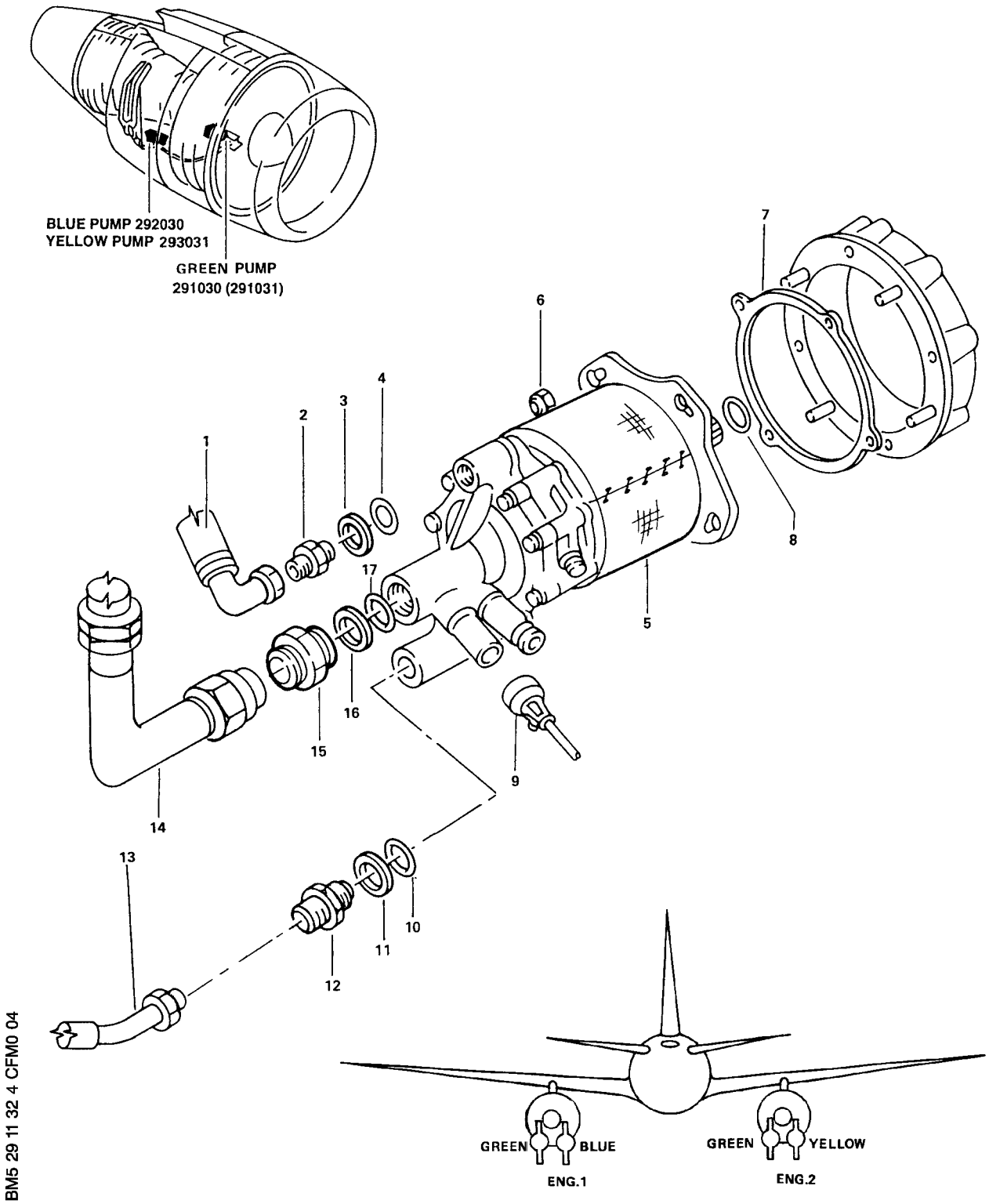
(Ref. Fig. 402)

WARNING : HYDRAULIC FLUID MAY CAUSE EYE, NOSE AND SKIN IRRITATION. AVOID PROLONGED BREATHING OF MIST OR VAPOR AND PROLONGED OR



Green Hydraulic Engine - Driven Pumps
Figure 401

R



Blue and Yellow Engine - Driven Pumps
Figure 402

R

REPEATED CONTACT WITH SKIN. IF THERE IS A POSSIBILITY OF SPLASH WEAR GOGGLES. PROTECTIVE GLOVES SHOULD BE WORN TO PREVENT DRYING OF SKIN DUE TO CONTACT WITH HYDRAULIC FLUID.

CAUTION : IF THE PUMP IS REMOVED BECAUSE OF OPERATION WITHOUT FLUID (DRY RUNNING), OR BECAUSE OF MALFUNCTIONING AND IF INTERNAL DAMAGE IS SUSPECTED, VISUALLY CHECK THE ASSOCIATED CASE DRAIN FILTER ELEMENT. IF METAL CHIPS OR DECOMPOSED HYDR. FLUID (JELLY) IS FOUND IN FILTER ELEMENT, VISUALLY CHECK ALSO THE ASSOCIATED HIGH PRESSURE FILTER ELEMENT. IF CONTAMINATION IS FOUND ON THE FILTERS, THE LINES CONNECTING THE PUMP TO THE FILTERS MUST BE FLUSHED (REF. 12-36-29, P. BLOCK 1). CLEAN PUMP AND GEARBOX CAVITIES OF DECOMPOSED HYDR. FLUID. CHECK DRAIN TUBE FOR CLOGGING AND FLUSH IF NECESSARY. SUPPORT THE PUMP DURING REMOVAL AND INSTALLATION OPERATION. APPROXIMATE WEIGHT : 13 KG (28 LB).

1 Cut and remove lockwire and disconnect electrical connector DV214 (9). Install blanking plug.

2 Disconnect suction and case drain hoses (14) and (1) from pump port union (15) and reducer (2).

CAUTION : SUCTION HOSE SELF SEALING HYDRAULIC COUPLING (14) MUST BE DISCONNECTED AT PUMP PORT UNION (15) SIDE. IF IT WERE DISCONNECTED AT THE HOSE SIDE, IT WOULD NO LONGER FULFIL ITS FUNTION, RESULTING IN CONSIDERABLE HYDRAULIC FLUID SPILLAGE.

3 Disconnect pressure hose (13) from reducer (12).

4 Remove reducer (12) discard back-up ring (11) and packing (10).

5 Remove union (15) and reducer (2). Discard packing (4) and (17) and retainer (3) and (16). Retain union and reducer for installation.

CAUTION : INSTALL BLANKING PLUGS ON DISCONNECTED HOSES AND ON PUMP PORTS TO PREVENT CONTAMINATION OF HYDRAULIC SYSTEM FLUID.

6 Loosen the four attaching nuts (6), support pump and rotate pump clockwise until nuts align with enlarged ends of pump mounting slots ; remove pump from mounting pad. Discard gasket (7) and install cover over pump mounting pump on gearbox.

7 Discard packing (8) from pump shaft.

8 Cut and remove lockwire and remove insulation (5) from pump body.

(b)Green pump.

(Ref. Fig. 401)

WARNING : HYDRAULIC FLUID MAY CAUSE EYE, NOSE AND SKIN IRRITATION. AVOID PROLONGED BREATHING OF MIST OR VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. IF THERE IS A POSSIBILITY OF SPLASH WEAR GOGGLES. PROTECTIVE GLOVES SHOULD BE WORN TO PREVENT DRYING OF SKIN DUE TO CONTACT WITH HYDRAULIC FLUID.

CAUTION : IF THE PUMP IS REMOVED BECAUSE OF OPERATION WITHOUT FLUID (DRY RUNNING), OR BECAUSE OF MALFUNCTIONING AND IF INTERNAL DAMAGE IS SUSPECTED, VISUALLY CHECK THE ASSOCIATED CASE DRAIN FILTER ELEMENT. IF METAL CHIPS OR DECOMPOSED HYDR. FLUID (JELLY) IS FOUND IN FILTER ELEMENT, VISUALLY CHECK ALSO THE ASSOCIATED HIGH PRESSURE FILTER ELEMENT. IF CONTAMINATION IS FOUND ON THE FILTERS, THE LINES CONNECTING THE PUMP TO THE FILTERS MUST BE FLUSHED.

SUPPORT THE PUMP DURING REMOVAL AND INSTALLATION OPERATION.
APPROXIMATE WEIGHT : 13 KG (28 LB).

1 Cut and remove lockwire and disconnect electrical connector DV213 (9). Install blanking plug.
2 Open clamps (31) and (32) by removing nut (30) and retain bolt (33).
3 Remove clamps (36) and (39) by removing nuts (34), retain bolts (37) and (38), plate (40) and washers (35).
4 Remove pressure tube (13) and suction tube (14), at pump side.
CAUTION : SUCTION TUBE SELF SEALING HYDRAULIC COUPLING (13) MUST BE DISCONNECTED AT PUMP PORT UNION (14) SIDE. IF IT WERE DISCONNECTED AT THE HOSE SIDE, IT WOULD NO LONGER FULFIL ITS FUNCTION, RESULTING IN CONSIDERABLE HYDRAULIC FLUID SPILLAGE.
5 Stow lines (13) and (14) to allow pump removal.
6 Disconnect case drain (1) hose and stow to allow pump removal.
7 Remove four nuts (6) and remove pump from mounting pad. Discard packing (8) and discard gasket (7). Install cover over pump mounting pad on gearbox.
8 Cut and remove lockwire and remove insulation (5) from pump body.
9 Remove reducer (12) discard backup ring (11), and packing (10).
10 Remove union (15) and reducer (2). Discard packings (4) and (17) and retainers (3) and (16). Retain union and reducer for installation.
CAUTION : INSTALL BLANKING PLUGS ON DISCONNECTED HOSES, TUBES AND ON PUMP PORTS TO PREVENT CONTAMINATION OF HYDRAULIC SYSTEM FLUID.

(3)Preparation of replacement component
CAUTION : DO NOT APPLY LUBRICANT ON POLYAMIDE-TYPE INTERNAL COUPLING-SHAFTS WHEN YOU INSTALL THE PUMP ON THE ENGINE GEARBOX. IF YOU APPLY LUBRICANT, DAMAGE CAN OCCUR.
NOTE : If replacing a damaged hydraulic pump, or a hydraulic pump that you suspect is damaged, replace the gearbox carbon seal before the replacement hydraulic pump is installed. (Ref. 72-65-08, P. Block 401).
NOTE : A damaged pump may be suspected if, when removed, a large quantity of hydraulic fluid is found trapped within the drain cavity and or if other evidence of gearbox carbon seal breach is noted. Other evidence of a carbon seal breach can include hydraulic fluid found in the gearbox, obvious hydraulic pump shaft misalignment, or unusual shaft wear patterns on the gearbox carbon seal.
NOTE : Before installation, you can clean seal face of main gearbox to remove coke or scoring (Ref. 72-65-01, P. Block 701).
NOTE : If replacement component is supplied without union and reducer, re-use union (15) and reducer (2) retained from removed pump.
(a)Lubricate retainer (3) and packing (4) with Material No.P02-001.
(b)Position retainer (3) and packing (4) on reducer (2).
(c)Install reducer (2) on pump port. TORQUE reducer to between 600 and 700 lbf.in. (6.77 and 7.9 m.daN).
(d)Lubricate retainer (16) and packing (17) with Material No.P02-001.
(e)Position retainer (16) and packing (17) on union (15).
(f)Install union (15) on pump port. TORQUE union to between 1350 and 1450 lbf.in. (15.25 and 16.38 m.daN).

(g)Lubricate packing (10) and ring (11) and reducer threads with Material No.P02-001.
(h)Install packings and rings on reducer threading.
(j)Install reducer (12) on pump port. TORQUE reducer to between 1350 and 1450 lbf.in. (15.25 and 16.38 m.daN).
(k)Lubricate packing (8) with Material No.P03-001 and install packing on pump shaft.
(l)Lubricate studs on mounting pad with Material No.P03-001 and install new gasket (7) on mounting pads.

(4)Installation

CAUTION : TO PREVENT INDUCING LOADS INTO THE DRIVE PAD CARBON SEAL, CARE SHOULD BE TAKEN TO PROPERLY ALIGN AND SUPPORT THE HYDRAULIC PUMPS DURING INSTALLATION.

(a)Blue pump and Yellow pump
(Ref. Fig. 402)
1 Install insulation (5) on pump body, and wirelock.
2 Remove cover from pump mounting pad on gearbox.
3 Position pump on the four studs. Install nuts (6) on studs loosely. Rotate pump counterclockwise to align nuts with mounting slots.
CAUTION : BEFORE YOU TORQUE THE NUTS, MAKE SURE THAT THE PUMP IS ROTATED FULLY IN THE COUNTERCLOCKWISE DIRECTION AND THE NUTS HAVE FULL FACE CONTACT ON 270 DEGREES OF THE NUT FACE ONTO THE PUMP FLANGE.
a TORQUE nuts (6) to between 275 and 300 lbf. in. (3.107 and 3.38 m.daN).
4 Connect suction hose (14) to union (15) and TORQUE to between 800 and 900 lbf.in. (9.03 and 10.16 m.daN).
5 Connect case drain (1) hose to reducer (2) and tighten case drain hose union on reducer. TORQUE to between 215 and 245 lbf.in. (2.42 and 2.76 m.daN).
6 Connect pressure hose (13) to reducer (12) and tighten pressure hose union on reducer and TORQUE to between 855 and 945 lbf.in. (9.66 and 10.67 daN).
7 Remove blanking plugs from pump receptacle and electrical connector (9). Connect connector and tighten connector coupling fingertight plus one-eighth turn.
8 Wirelock.
(b)Green pump
(Ref. Fig. 401)
1 Install insulation (5) on pump body, and wirelock.
2 Remove cover from pump mounting pad on gearbox.
3 Position pump on the four studs. Install nuts (6) on studs loosely. Rotate pump counterclockwise to align nuts with mounting slots.
CAUTION : BEFORE YOU TORQUE THE NUTS, MAKE SURE THAT THE PUMP IS ROTATED FULLY IN THE COUNTERCLOCKWISE DIRECTION AND THE NUTS HAVE FULL FACE CONTACT ON 270 DEGREES OF THE NUT FACE ONTO THE PUMP FLANGE.
a TORQUE nuts (6) to between 275 and 300 lbf. in. (3.107 and 3.38 m.daN).
4 Install case drain (1) hose on reducer (2). TORQUE case drain hose end to between 215 and 245 lbf.in. (2.42 and 2.76 m.daN).

5 Screw in loosely suction tube (14) end on union (15).
6 Install clamp (36) and install bolts (37), washers (35) and nuts (34). Tighten nuts (34).
7 When suction tube (14) is correctly positioned tighten it on union (15) and TORQUE to between 800 and 900 lbf.in. (9.03 and 10.16 m.daN).
8 Screw in loosely the pressure tube (13) end on reducer (12).
9 Install clamp (39) and install bolts (38), washers (35) and nuts (34). Tighten nuts (34).
10 When pressure tube is correctly positioned, tighten it on reducer (12) and TORQUE to between 855 and 945 lbf.in. (9.66 and 10.65 m.daN).
11 Install bolts (33) in order to secure clamps (31) and (32) and tighten nut (30).
12 Remove blanking plug from pump receptacle and connector DV214 (9). Connect connector and tighten connector coupling fingertight plus one-eighth turn.
13 Wirelock.

(5)Bleeding
(a)Open, safety and tag following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1&2/FIRE EXTING/SQUIB A/BTL1	1WE	335/R71
133VU	ENG1&2/FIRE EXTING/SQUIB A/BTL2	3WE	335/R72
22VU	FIRE EXTING/ENG1 & 2/SQUIB B/BTL1	5WE	207/C19
22VU	FIRE EXTING/ENG1 & 2/SQUIB B/BLT2	7WE	207/C20

(b)Remove safety clips and tags and close circuit breakers associated with pump to be removed (101GK or 103GK).
(c)Pull applicable fire handle to close the fire valve.
(d)Disconnect case drain hose (1) at connection with filter assy and place the open end in a clean container (8 liters capacity approx.).
(e)Pressurize associated system reservoir (Ref. 29-14-00, P. Block 301).
(f)Push fire handle (fire valve opens) until airfree hydraulic fluid flows out from case drain hose into the container. Pull fire handle (fire valve, closes) when bleeding is completed.
NOTE : If necessary, repeat operations (5) (C) and 5 (e) above or continuously pressurize the affected reservoir.
(g)Connect case drain hose (1) to filter assy and TORQUE to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).
R (h)Push fire handle (fire valve opens) and safety with snapwire.
(j)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).
(k)Remove safety clips and tags and close circuit breakers 1WE, 3WE, 5WE, 7WE.

(6)Check of bleeding efficiency
(a)Perform following steps to make certain that there is no air in hydraulic system :
1 Make certain that air pressure in related hydraulic reservoir is not less than 3.5 bars (50 psi). If necessary, pressurize reservoir

(Ref. 29-14-00, P. Block 301).

2 On related reservoir hydraulic quantity transmitter, record position of fluid level pointer.

3 Depressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301).

4 On related hydraulic quantity transmitter, record movement of fluid level pointer.

NOTE : Movement of pointer shows an increase of fluid level in reservoir because of air expansion in system.

5 If movement of pointer between pressurized and depressurized conditions is more than :
- 2 liters for Green system,
- 1.5 liters for Blue system,
- 1.5 liters for Yellow system,

repeat bleeding procedure until result is satisfactory.

(7)Test

(a)Check that case drain filter clogging indicator is in retracted position. Manually press if necessary.

(b)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 5GD, 99GK, 101GK, or 1GE, 2GE, 4GE, 5GD, 100GK, 103GK or 5GD, 31GJ, 101GK, 1GL or 1GD, 5GD, 103GK, 6GL.

(c)Pressurize associated system reservoir (Ref. 29-14-00, P. Block 301).

(d)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(e)On ECAM control panel, press HYD pushbutton switch and on panel 427VU, make certain that corresponding ENG PUMP pushbutton switch is pressed (in).

(f)Dry-motor the engine (Ref. 71-00-00, P. Block 501).

(g)Slowly move the flight controls as follows :
- Rudder control pedals : check rudder movement on ECAM FLT CTL page.
- Aileron control : check ailerons movement on ECAM FLT CTL page.

(h)Check connections for leakage.

(j)On right ECAM display unit, check that pressure reading is 3000 ± 200 psi (206 ± 13.5 bars) for corresponding hydraulic system.

(k)Switch off the concerned engine driven pump through the relevant pushbutton.
- Check that the system pressure drops (If not, the solenoid valve function is not correct and must be checked).
- Switch on again the engine driven pump.

(l)Stop dry-motoring engine.

(m)On right ECAM display unit, check that pressure reading decreases for corresponding hydraulic system.

(n)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1)

(p)Check that associated hoses are installed in such a manner, that no chafing against each other or against structure is possible.

(8)Close-up

(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)

(b)Remove container

(c)Close fan cowl (Ref. 71-13-00, P. Block 301)
(d)Remove warning notice.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Engine Pumps

A. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Blanking Plugs/Caps
	(2)	Circuit Breaker Safety Clips
	(3)	Container
	(4)	Warning Notice
R	(5)	Snapwire, 0.3 or 0.4 mm (0.012 or 0.015 in.)
R		with breaking strength 2.0 to 3.5 daN
R		(4.5 to 7.9 lbf)
R	(6)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
R	(7)Material No. 03-002	Oils (Ref. 20-31-00)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
	- 71-00-00, P. Block 501	Power Plant - General
	- 71-13-00, P. Block 301	Cowl Doors

B. Procedure

(1)Job set-up

(a)Make sure that the check of the Green, Blue and Yellow hydraulic systems after operation of the engine pumps in possible starvation or cavitation condition has been done if necessary. (Ref. 29-00-00, P. Block 301).

(b)Open, safety and tag the following circuit breakers associated with pump to be removed.

PANEL	SERVICE	IDENT.	LOCATION
	Engine 1 Green Pump		
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/G	99GK	331/V58

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
	Engine 2 Green Pump		
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
	Engine 1 Blue Pump		
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	PTU CTL/G/B	1GL	332/U59
	Engine 2 Yellow Pump		
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	PTU CTL/G/Y	6GL	332/U60

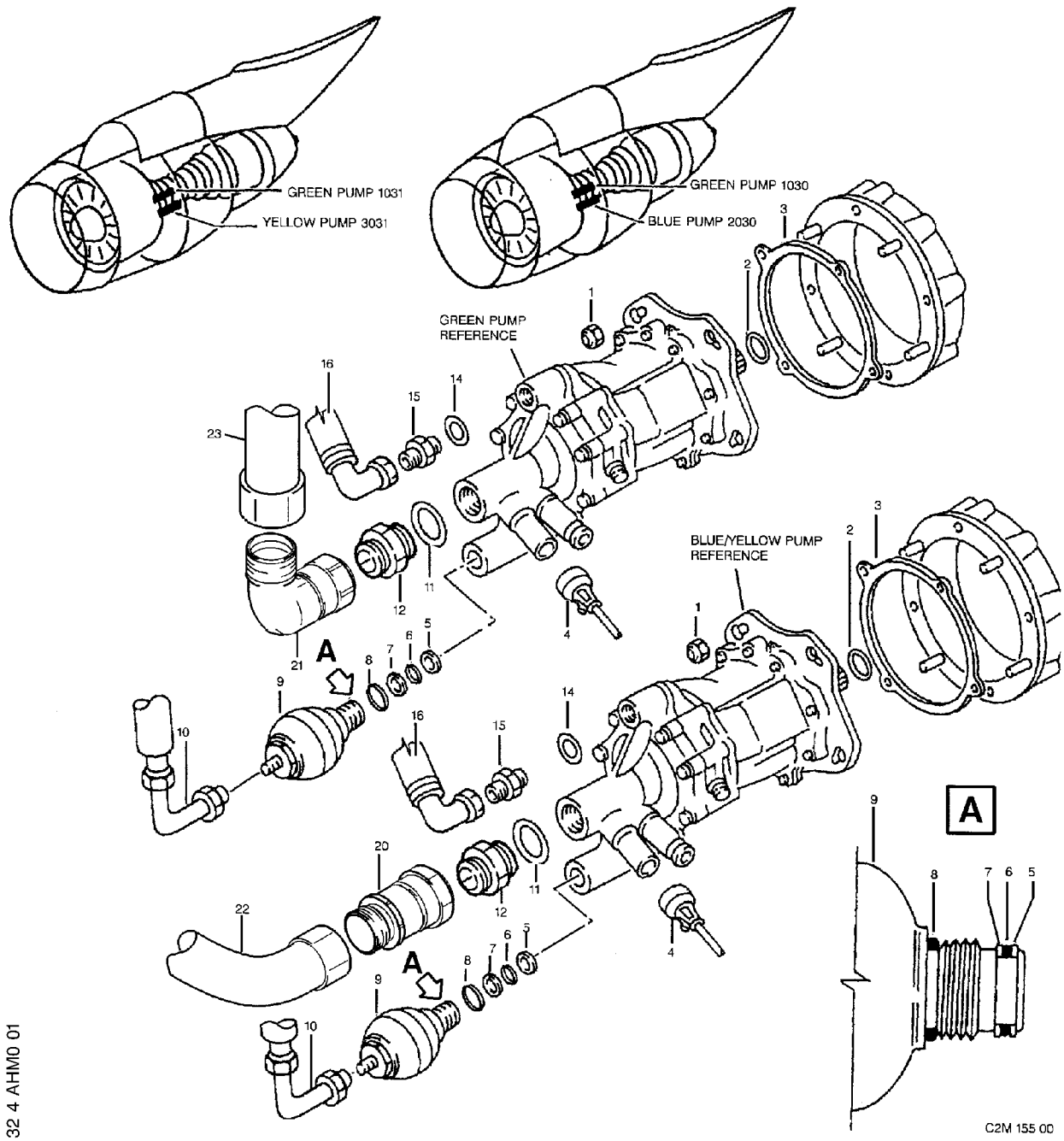
(c)Depressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).
(d)Depressurize associated system reservoir (Ref. 29-14-00, P. Block 301).
(e)Display a warning notice on panel 427VU prohibiting operation of the system associated with pump to be removed.
(f)Open engine 1 or engine 2 fan cowl (Ref. 71-13-00, P. Block 301).
(g)Place container under pump and lines to be removed.

(2)Removal

(Ref. Fig. 401)

WARNING : HYDRAULIC FLUID MAY CAUSE EYE, NOSE, AND SKIN IRRITATION. AVOID PROLONGED BREATHING OF MIST OR VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. IF THERE IS A POSSIBILITY OF SPLASH, WEAR GOGGLES. PROTECTIVE GLOVES SHOULD BE WORN TO PREVENT DRYING OF SKIN DUE TO CONTACT WITH HYDRAULIC FLUID.

CAUTION : IF THE PUMP IS REMOVED BECAUSE OF OPERATION WITHOUT FLUID (DRY RUNNING), OR BECAUSE OF MALFUNCTIONING AND IF INTERNAL DAMAGE IS SUSPECTED, VISUALLY CHECK THE ASSOCIATED CASE DRAIN FILTER ELEMENT. IF METAL CHIPS OR DECOMPOSED HYDR. FLUID (JELLY) IS FOUND IN FILTER ELEMENT, VISUALLY CHECK ALSO THE ASSOCIATED HIGH PRESSURE FILTER ELEMENT. IF CONTAMINATION IS FOUND ON THE FILTERS, THE LINES CONNECTING THE PUMP TO THE FILTERS MUST BE FLUSHED. CLEAN PUMP AND GEARBOX CAVITIES OF



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Hydraulic Engine Driven Pumps
Figure 401

R

DECOMPOSED HYDR. FLUID.
CHECK DRAIN TUBE FOR CLOGGING AND FLUSH IF NECESSARY.
SUPPORT THE PUMP DURING REMOVAL AND INSTALLATION OPERATION.
APPROXIMATE WEIGHT : 13 KG (28 LB).

NOTE : As removal/installation operations are identical for each of the four pumps, this topic deals with only one pump.

(a)Cut and remove lockwire and disconnect electrical connector (4).
(b)Disconnect case drain hose (16) from reducer (15).
(c)GREEN PUMP,
Disconnect suction hose (23) and self sealing adapter assembly (21) from pump port union (12).
(d)BLUE/YELLOW PUMP,
Disconnect suction hose (22) and self sealing adapter assembly (20) from pump port union (12).
CAUTION : SUCTION HOSE SELF SEALING ADAPTER ASSEMBLY (20, 21) MUST BE DISCONNECTED AT PUMP PORT UNION (12) SIDE. IF IT WERE DISCONNECTED AT THE HOSE SIDE, IT WOULD NO LONGER FULFIL ITS FUNCTION, RESULTING IN CONSIDERABLE HYDRAULIC FLUID SPILLAGE.
(e)Disconnect hose (10) from pulsation dampener (9).
(f)Remove pulsation dampener (9), discard backup rings (5, 7) and packings (6, 8).
(g)If replacement component is without union and reducer, remove union (12) and reducer (15) from removed pump. Discard packings (11, 14).
CAUTION : INSTALL BLANKING PLUGS ON DISCONNECTED HOSES AND ON PUMP PORTS TO PREVENT CONTAMINATION OF HYDRAULIC SYSTEM FLUID.
(h)Loosen the four attaching nuts (1), support pump and rotate clockwise to remove.
(i)Discard packing (2) and gasket (3).

(3)Preparation of replacement component
(a)Install a new packing (2) lubricated with Material No.03-002, on pump shaft.
(b)On accessory gear box side : install a new gasket (3).
(c)If replacement component is without union and reducer, install new packings (11, 14) and install union (12) and reducer (15) taken from removed pump. Tighten moderately.
(d)On pulsation dampener (9) install new packings (6 and 8) and new backup rings (5 and 7) previously coated with Material No.02-003.
(e)Install pulsation dampener (9) on pump. Tighten moderately.

(4)Installation
(Ref. Fig. 401)
CAUTION : TO PREVENT INDUCING LOADS INTO THE DRIVE PAD CARBON SEAL, CARE SHOULD BE TAKEN TO PROPERLY ALIGN AND SUPPORT HYDRAULIC PUMPS DURING INSTALLATION.
(a)Position pump onto the four mounting studs, rotate counter clockwise until stopped by studs. TORQUE nuts (1) to between 275 and 300 lbf.in. (3.1 and 3.39 m.daN).
(b)TORQUE reducer (15) to between 600 and 700 lbf.in. (6.77 and 7.9 m.daN).
(c)Connect case drain hose (16) to reducer (15) and TORQUE to between 265 and 295 lbf.in. (2.99 and 3.33 m.daN).

(d)TORQUE union (12) to between 1350 and 1450 lbf.in. (15.52 and 16.38 m.daN).
(e)TORQUE pulsation dampener (9) to between 950 and 1050 lbf.in. (10.73 and 11.86 m.daN).
(f)Connect pressure hose (10) to pulsation dampener (9) and TORQUE to between 715 and 785 lbf.in. (8.07 and 8.87 m.daN).
(g)GREEN PUMP,
Connect suction hose (23) and self sealing adapter assembly (21) to union (12) and TORQUE to between 800 and 900 lbf.in. (9.04 and 10.17 m.daN).
NOTE : When torquing self sealing adapter assembly (21), hold suction hose (23) to prevent contact with thrust reverser cowling.
(h)BLUE/YELLOW PUMP,
Connect suction hose (22) and self sealing adapter assembly (20) to union (12) and TORQUE to between 800 and 900 lbf.in. (9.04 and 10.17 m.daN).
NOTE : When torquing self sealing adapter assembly (20), hold suction hose (22) to prevent contact with thrust reverser cowling.
(i)Connect electrical connector (4) and safety with lockwire.
CAUTION : TAKE CARE TO THE POSITION OF THE COUPLING OF THE HOSES (10) AND (22, 23) IN ORDER TO ALLOW CLEARANCE :
- BETWEEN HYDRAULIC LINES AND COWLING.
- BETWEEN SUCTION AND PRESSURE LINES OF THE LOWER PUMP.

(5)Bleeding

(a) Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1 & 2/FIRE EXTING/SQUIB A/BTL 1	1WE	335/R71
133VU	ENG1 & 2/FIRE EXTING/SQUIB A/BTL 2	3WE	335/R72
22VU	FIRE EXTING/ENG1 & 2/SQUIB B/BTL 1	5WE	207/C19
22VU	FIRE EXTING/ENG1 & 2/SQUIB B/BTL 2	7WE	207/C20

(b)Remove safety clips and tags and close circuit breakers associated with pump to be removed (101GK or 103GK).
(c)Pull applicable fire handle to close fire valve.
(d)Disconnect case drain hose (16) at connection with filter assy and place the open end in a clean container (8 liters capacity approx.)
(e)Pressurize associated system reservoir (Ref. 29-14-00, P.Block 301)
(f)Push fire handle (fire valve opens) until airfree hydraulic fluid flows out from case drain hose into the container. Pull fire handle (fire valve closes) when bleeding is completed.
NOTE : If necessary, repeat operations (5) (C) and (5) (e) above or continuously pressurize the affected reservoir.
(g)Connect case drain hose (16) to filter assy and TORQUE to between

270 and 300 lbf.in. (3.05 and 3.39 m.daN).

R (h)Push fire handle (fire valve opens) and safety with snapwire.

(j)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1)

(k)Remove safety clips and tags and close circuit breakers 1WE, 3WE, 5WE, 7WE.

(6)Check of bleeding efficiency

(a)Perform following steps to make certain that there is no air in hydraulic system :

1 Make certain that air pressure in related hydraulic reservoir is not less than 3.5 bars (50 psi). If necessary, pressurize reservoir (Ref. 29-14-00, P. Block 301).

2 On related reservoir hydraulic quantity transmitter, record position of fluid level pointer.

3 Depressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301).

4 On related hydraulic quantity transmitter, record movement of fluid level pointer.

NOTE : Movement of pointer shows an increase of fluid level in reservoir because of air expansion in system.

5 If movement of pointer between pressurized and depressurized conditions is more than :
- 2 liters for Green system,
- 1.5 liters for Blue system,
- 1.5 liters for Yellow system,

repeat bleeding procedure until result is satisfactory.

(7)Tests

(a)Check that case drain filter clogging indicator is in retracted position. Manually press if necessary.

(b)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 5GD, 99GK, 101GK or 1GE, 2GE, 4GE, 5GD, 100GK, 103GK or 5GD, 31GJ, 101GK, 1GL or 1GD, 5GD, 103GK, 6GL.

(c)Pressurize associated system reservoir (Ref. 29-14-00, P. Block 301).

(d)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(e)On ECAM control panel, press HYD pushbutton switch and on panel 427VU, make certain that corresponding ENG PUMP pushbutton switch is pressed (in).

(f)Dry-motor the engine (Ref. 71-00-00, P. Block 501).

(g)Slowly move the flight controls as follows :
- Rudder control pedals : check rudder movement on ECAM FLT CTL page.
- Aileron control : check ailerons movement on ECAM FLT CTL page.

(h)Check connections for leakage.

(j)On right ECAM display unit, check that pressure reading is 3000 ± 200 psi (206 ± 13.5 bars) for corresponding hydraulic system.

(k)Switch off the concerned engine driven pump through the relevant pushbutton :
- check that the system pressure drops (if not, the solenoid valve function is not correct and must be checked)
- switch on again the engine drive pump.

(l)Stop dry-motoring engine.
(m)On right ECAM display unit, check that pressure reading decreases for corresponding hydraulic system.
(n)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).
(p)Check that associated hoses are installed in such a manner, that no chafing against each other or against structure is possible.

(8)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Remove container.
(c)Close fan cowl (Ref. 71-13-00, P. Block 301).
(d)Remove warning notice.

2. Not Applicable

ENGINE PUMP FIRE VALVE, GREEN 110GK, 111GK - BLUE 9GJ - YELLOW 2GD
REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Fire Valve Removal/Installation

A. Equipment and Materials

	ITEM	DESIGNATION
	(a)	Containers
	(b)	Blanking Plugs/Caps
	(c)	Warning Notices
	(d)	Access Platform 3.80 m (12 ft. 5 in.)
	(e)	Equipped FACOM Torque Wrench, type S313U (or equivalent)
R	(f)Material No. 08-007	Bonding and Adhesive Compounds (Ref. 20-31-00)
R	(g)Material No. 08-009	Bonding and Adhesive Compounds (Ref. 20-31-00)
R	(h)Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
R	- 20-31-00, P. Block 1	List of Materials required for Aircraft
R		Service and Maintenance
	- 29-10-00, P. Block 301	Main Servicing
	- 29-10-00, P. Block 501	Main Hydraulic Power - Adjustment Test
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

B. Procedure

(1)Job set-up

(a)In flight compartment, on HYD PWR panel 427VU ;

1 Make certain that hydraulic system concerned is inoperative (ELEC PUMPS pushbutton switch released (out), ON legend off and PTU pushbutton switches released (out), ON legend off).

2 Display a warning notice prohibiting operation of hydraulic system associated with fire valve to be removed.

(b)Open, safety and tag the following circuit breakers.

1 Green L engine pump fire valve 111GK (291046)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 1 & 2/FIRE VALVES	101GK	334/S57

2 Green R engine pump fire valve 110GK (291047)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 1 & 2/FIRE VALVES	103GK	334/S58

3 Blue L engine pump fire valve 9GJ (292046)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 1 & 2/FIRE VALVES	101GK	334/S57
133VU	PTU CTL/G/B	1GL	332/U59

4 Yellow R engine pumps fire valve 2GD (293047)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 1 & 2/FIRE VALVES	103GK	334/S58
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(c)In zone 571, for Blue hydraulic system ;
or 671, for Yellow hydraulic system;
or 147, for Green hydraulic system.

1 Position access platform.
2 Open access door 571DB (671DB) 147AL.
3 Connect depressurizing equipment to reservoir depressurization/relief valve 292005 (293005)(291005). Depressurize reservoir of hydraulic system concerned (Ref. 29-14-00, P. Block 301). Leave equipment connected.

(d)In zone 575 (675).

1 Position access platform.
2 Open access doors 575BB (675BB), 575CB, (675CB), 575DB (675DB).
3 By access doors 575BB (675BB), 575CB (675CB) loosen clamp blocks to have the suction pipes free (Ref. Fig. 402).

(e)Place cellulose wool or absorbent material in relevant fire valve zone.

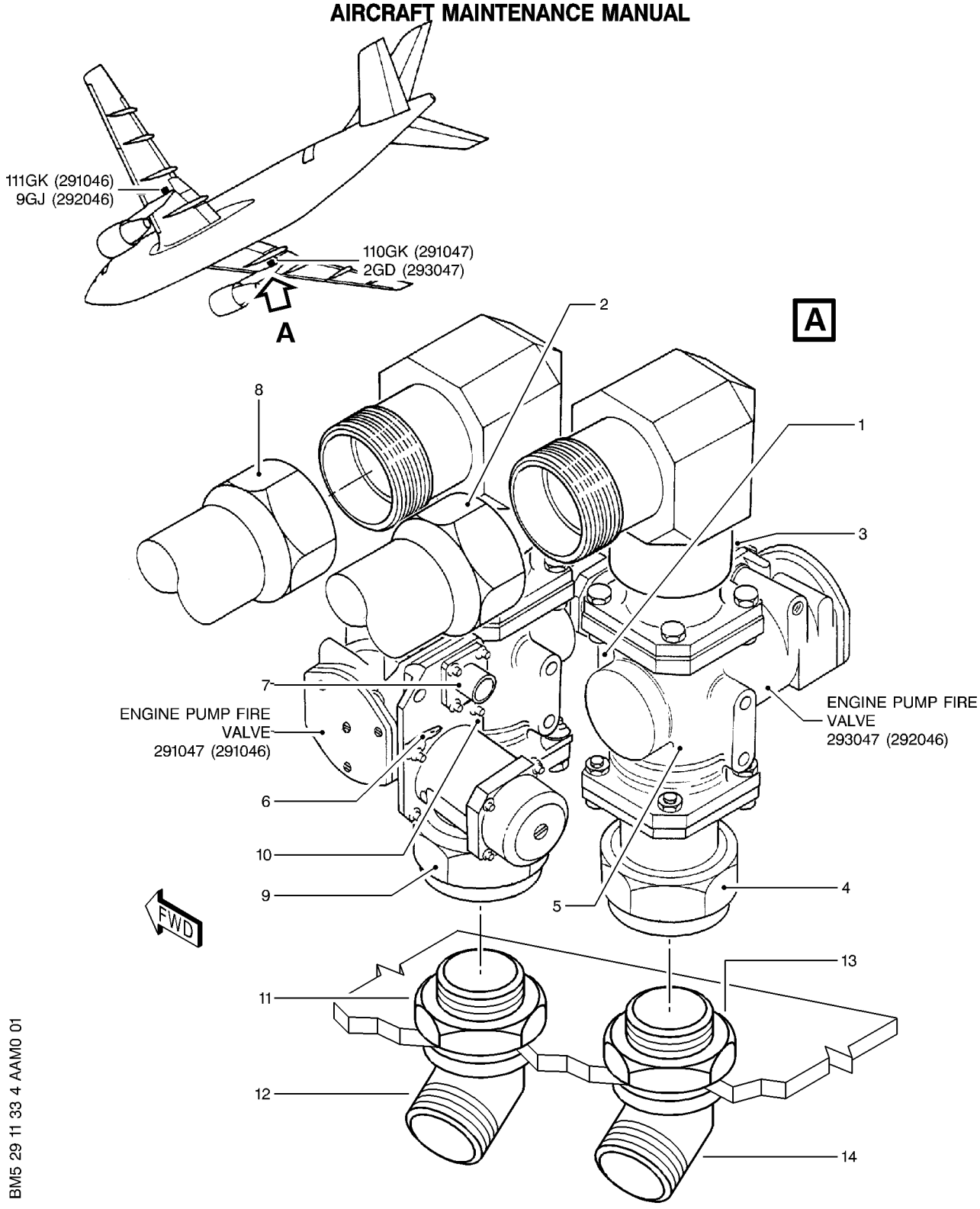
(2)Removal

(Ref. Fig. 401)
(Ref. Fig. 402)

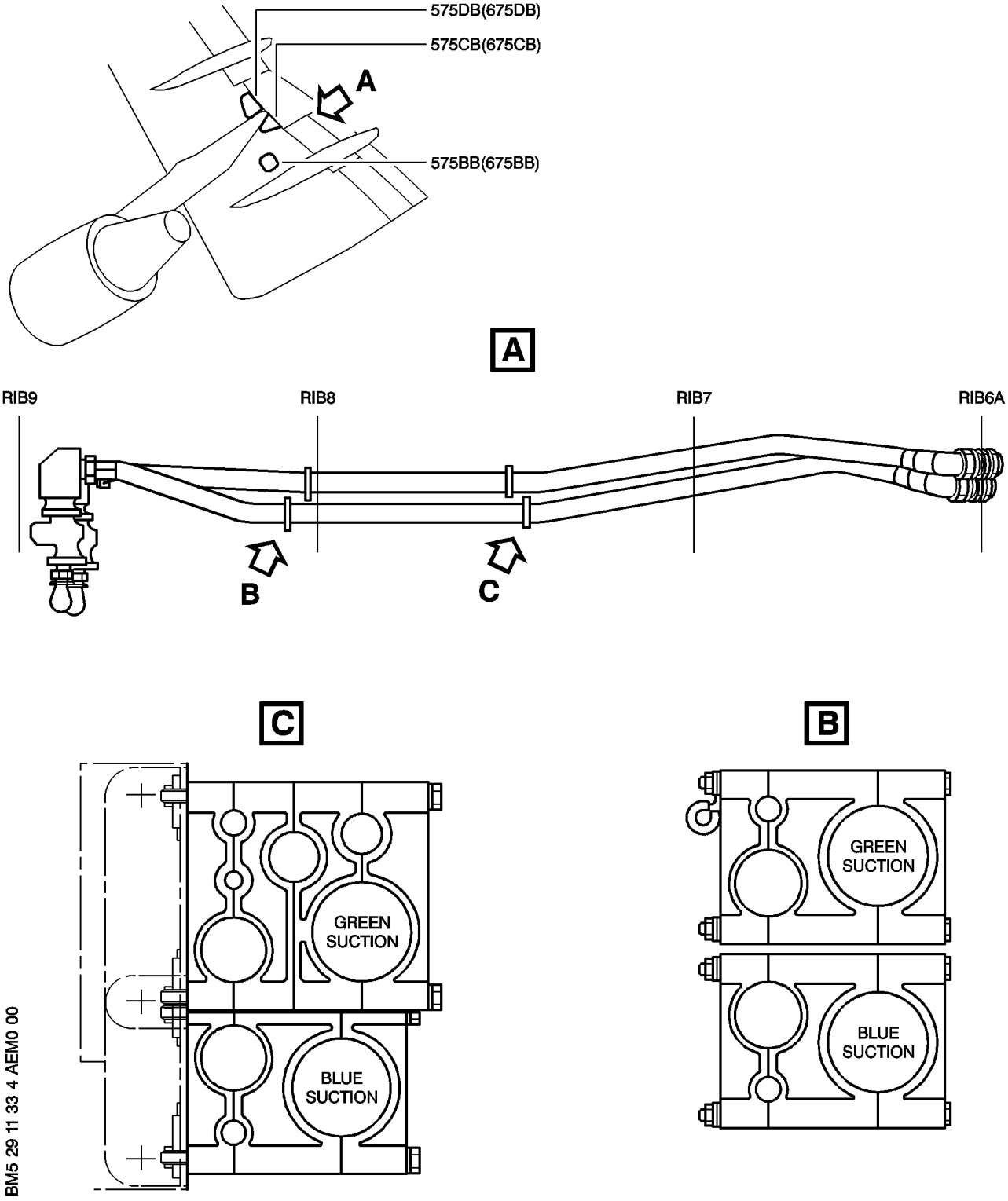
(a)Remove fire valve 293047 (292046).

1 Disconnect electrical connector and cap equipment receptacle (3) and plug.
2 Unscrew union (2). Install protective plugs/caps on equipment and union.
R 3 Cut and remove lockwire from union nut (4).
R 4 Use a second wrench to apply countertorque to nut (13) and unscrew
R union nut (4).
R 5 Remove valve (5), install blanking plugs/caps on equipment and union.

(b)Remove fire valve 291047 (291046).



Engine Pump Fire Valve
Figure 401



Clamp Blocks of Hydraulic Suction Pipes
Figure 402

1 Remove fire valve 293047 (292046).
2 Disconnect electrical connector and cap equipment receptacle (7) and plug.
3 Unscrew union (8). Install protective plugs/caps on equipment and union.
R 4 Cut and remove lockwire, from union nut (9).
R 5 Use a second wrench to apply countertorque to nut (11) and unscrew union nut (9).
R 6 Remove valve (10), install protective plugs/caps on equipment and union.

(3)Preparation of replacement component
(a)Depreserve equipment, remove blanking plugs/caps. Check correct external condition, remove storage hydraulic fluid.
(b)Carefully clean working area and check that area is clean and clear of tools andmiscellaneous items of equipment.
(c)Check correct condition of electrical connectors.
R NOTE : To avoid possible leaks and loosening of nuts (11) and (13), we recommend to bond nuts (11) and (13) on elbow fittings (12) and (14).
R Proceed as follows :
R - Clean the threads of elbows (12) and (14) with cleaning agent (Material No. 11-003)
R - Let dry the surfaces
R - Apply activator (Material No. 08-009) on the threads of the elbows
R - Let dry the activator according to supplier recommendations
R - Apply a thin layer of adhesive compound (Material No. 08-007) on elbows
R - TORQUE nuts (11) and (13) to between 1200 and 1440 lbf.in. (13.5 and 16.3 m.daN)
R - Remove excess adhesive with a lint-free cloth
R - Let dry 3 hours at ambient temperature.

(4)Installation
(a)Install fire valve 291047 (291046).
1 Position fire valve (10).
2 Engage union nut (9). Do not fully tighten.
3 Engage union nut (8). Do not fully tighten.
4 Align fire valve between the two unions. TORQUE unions (9) and (8), to between 71.54 and 78.92 lbf.ft. (9.7 and 10.7 m.daN).
5 Safety nut (9) with lockwire.
6 Connect electrical plug to fire valve actuator receptacle (7).
(b)Install fire valve 293047 (292046).
1 Position fire valve (5).
2 Engage union nut (4). Do not fully tighten.
3 Engage union nut (2). Do not fully tighten.
4 Align fire valve between the two unions. TORQUE unions (4) and (2) to between 71.54 and 78.92 lbf.ft. (9.7 and 10.7 m.daN).
5 Safety nut (4) with lockwire.
6 Connect electrical plug to fire valve actuator receptacle (3).

(5)Tests
(a)Disconnect depressurizing equipment from depressurization/relief valve

291005 (292005)(293005).
(b)Remove safety clips and tags and close circuit breakers mentioned in paragraph 2.B.(1)(b).
(c)Remove warning notices.
(d)Pressurize reservoir of hydraulic system concerned (Ref. 29-14-00, P. Block 301).
(e)Check hydraulic fluid levels. Top up if required (Ref. 12-12-29, P. Block 1).
(f)Pressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).
(g)Perform functional test of fire valves removed (Ref. 29-10-00, P. Block 501).
(h)Check for possible leakage at the various connections on fire valve and on lines.
(j)Depressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).
(6)Close-Up
(a)By access doors 575BB (675BB), 575CB (675CB), tighten clamp blocks (Ref. Fig. 402).
(b)Remove recovery containers and absorbent materials.
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)Close access doors 571 DB (671 DB), 147AL, 575BB (675BB), 575CB (675CB) and 575DB (675DB).
(e)Remove access platform.
(f)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

R 2. Fire Valve Actuator Removal/Installation

R A. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Caps
(2)	Warning Notice
(3)	Access Platform 3.80 m (12 ft. 5 in.)
Referenced Procedures	
- 20-28-11, P. Block 1	Electrical Bonding - General
- 29-10-00, P. Block 501	Main Hydraulic Power - Adjustment Test
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

R B. Procedure
R (1)Job set-up
R (a)In flight compartment, on HYD PWR control panel 427VU :
R 1 Make certain that hydraulic system concerned is inoperative
R - The ELEC PUMPS pushbutton switch is released (the ON legend is off).
R - The PTU pushbutton switches are released (the ON legends are off).
R 2 Display a warning notice prohibiting operation of hydraulic system associated with fire valve actuator to be removed.
R (b)Open, safety and tag the following circuit breakers :
R 1 Green L engine pump fire valve 111GK (291046)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 1 & 2/FIRE VALVES	101GK	334/S57

2 Green R engine pump fire valve 110GK (291047)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 1 & 2/FIRE VALVES	103GK	334/S58

3 Blue L engine pump fire valve 9GJ (292046)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 1 & 2/FIRE VALVES	101GK	334/S57
133VU	PTU CTL/G/B	1GL	332/U59

4 Yellow R engine pumps fire valve 2GD (293047)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 1 & 2/FIRE VALVES	103GK	334/S58
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(c)In zone 571, for Blue hydraulic system ;
or 671, for Yellow hydraulic system ;
or 147, for Green hydraulic system.
1 Position access platform.
2 Open access door 571DB (671DB), 147AL.
3 Depressurize reservoir of hydraulic system concerned (Ref. 29-14-00, P. Block 301).
(d)In zone 575 (675).
1 Position access platform.
2 Open access doors 575DB (675DB).

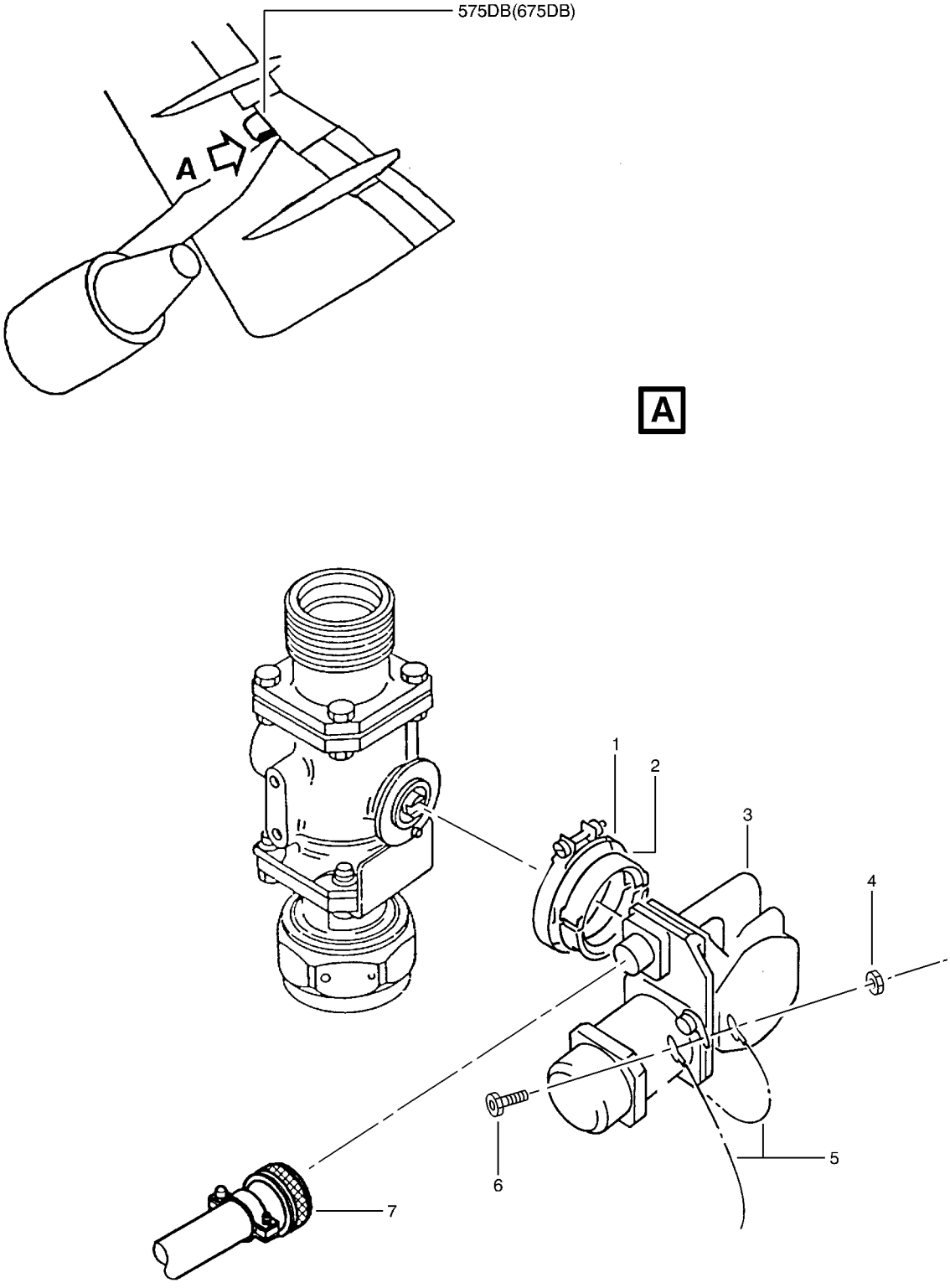
(2)Removal

(Ref. Fig. 403)

NOTE : As the four fire valve actuators are identical, only removal of one actuator is described.

(a)Disconnect electrical connector (7) and install blanking caps.
(b)Remove screw (6), nut (4) and bonding leads (5).
(c)Loosen clamp (1).
(d)Support fire valve actuator (3).
(e)Remove clamping ring (2) and clamp (1).
(f)Remove fire valve actuator (3).

(3)Preparation of replacement component



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Engine Pump Fire Valve Actuator
Figure 403

R

R (a)Depreserve equipment, remove blanking caps and make certain that
R equipment is in correct condition.
R (b)Carefully clean and inspect work area when component is to be mounted.
R (d)Check correct condition of electrical connectors.
R (4)Installation
R (a)Install fire valve actuator (3).
R (b)Install clamping ring (2) and clamp (1).
R (c)Tighten clamp (1).
R (d)Install screw (6), bonding leads (5) and nut (4).
R (e)Tighten nut (4).
R NOTE : You must do an electrical bonding when you install bonding
R leads (5) (Ref. 20-28-11, P. Block 1).
R (f)Connect electrical connector (7) to actuator receptacle.
R (5)Tests
R (a)Pressurize reservoir of hydraulic system concerned (Ref. 29-14-00,
R P. Block 301).
R (b)Remove safety clips and tags and close circuit breakers mentioned in
R Para. 2.B.(1)(b).
R (c)Remove warning notice.
R (d)Perform functional test of fire valves and actuators (Ref. 29-10-00,
R P. Block 501).
R (6)Close-Up
R (a)Make certain that working area is clean and clear of tools and
R miscellaneous items of equipment.
R (b)Close access doors.
R (c)Remove access platform.

ENGINE PUMP FIRE VALVE, GREEN 110GK, 111GK - BLUE 9GJ - YELLOW 2GD - INSPECTION/CHECK

1. Hydraulic Pipes in Wing Area L/R Between Rib 6A and Rib 9

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

A. Reason for the Job

To do a detailed inspection of hydraulic pipes in wing area L/R between rib 6A and rib 9.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Warning Notices
(2)	Access Platform 3.80 m (12 ft. 5 in.)
Referenced Procedures	
- 20-23-11, P. Block 1	Installation and Repair of Tubing
- 20-23-14, P. Block 1	Protection from Vibration and Chafing of Hydraulic Pipes
- 29-11-33, P. Block 401	Engine Pump Fire Valve, Green 110GK, 111GK - Blue 9GJ - Yellow 2GD
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- SRM 572045	

C. Procedure

(Ref. Fig. 601)

(1) Job set-up

(a) In flight compartment, on HYD PWR panel 427VU :

1 Make certain that hydraulic system concerned is inoperative (ELEC PUMPS pushbutton switch released (out), ON legend off and PTU pushbutton switches released (out), ON legend off).

2 Display a warning notice prohibiting operation of hydraulic system associated with fire valve to be removed.

(b) Open, safety and tag the following circuit breakers :

1 L engine pump fire valve 111GK (291046) and 9GJ (292046)

PANEL	SERVICE	IDENT.	LOCATION
128VU	ELEC/PUMPS/WARN/& CTL	4GE	801/R70
128VU	FIRE VALVES/ENG1	101GK	802/P73
128VU	PTU CTL/G/B	1GL	801/R76

2 R engine pump fire valve 110GK (291047) and 2GD (293047)

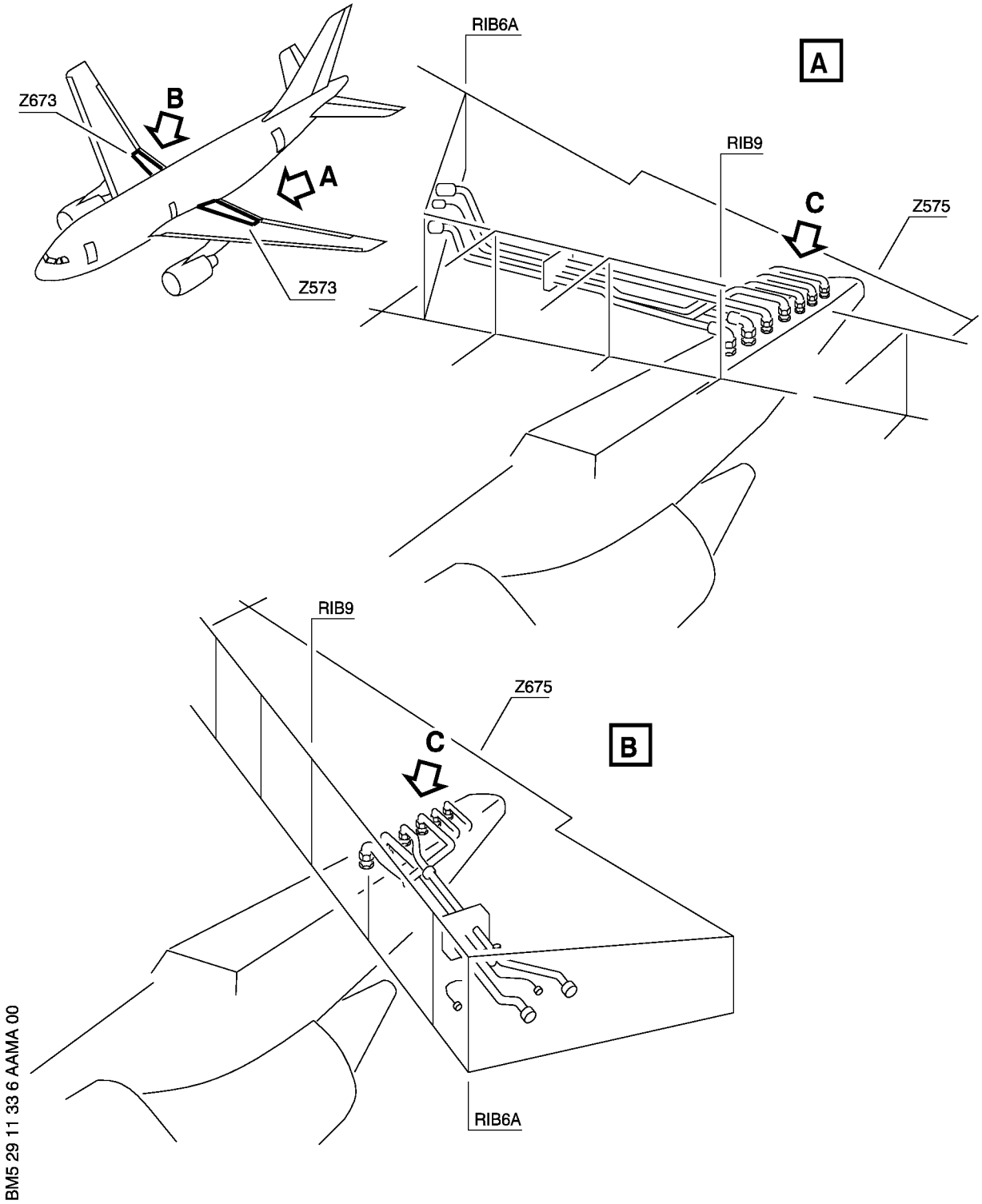
PANEL	SERVICE	IDENT.	LOCATION
128VU	ELEC/PUMPS/WARN/& CTL	4GE	801/R70
128VU	PTU CTL/G/B	1GL	801/R76
128VU	PTU CTL/G/Y	6GL	801/R77
128VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	802/P70

(c)In zone 571 or 671 or 147 :
1 Position access platform.
2 Open access door 571DB (671DB) 147AL.
3 Connect depressurizing equipment to reservoir depressurization/relief valve 292005 (293005)(291005). Depressurize reservoir of hydraulic system concerned (Ref. 29-14-00, P. Block 301). Leave equipment connected.

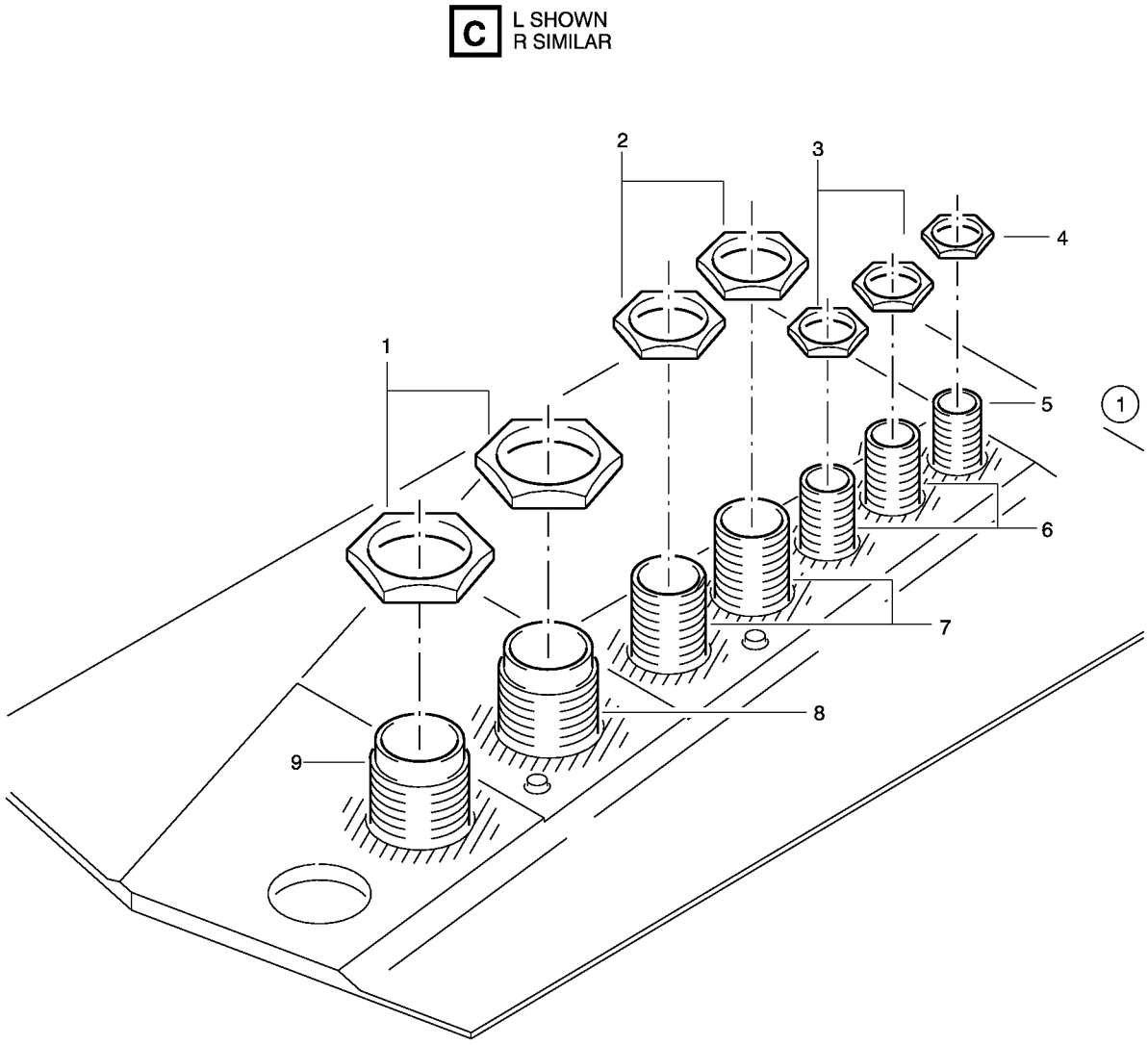
(d)In zone 575 (675) :
1 Position access platform.
2 Open access doors 575BB (675BB), 575CB, (675CB), 575DB (675DB).
3 By access doors 575BB (675BB), 575CB (675CB) loosen clamp blocks to have the suction pipes free.

(2)Inspection
(a)Do detailed inspection of hydraulic pipes in affected wing area L/R between rib 6A and rib 9.
1 Examine connections of unions for leaks.
NOTE : Leaks are not permitted.
2 Inspect the B-nuts (1), (2), (3) and (4) of fittings (5), (6), (7), (8) and (9).
a If B-nuts are loosened, inspect relevant structure holes.
- If structure holes are not elongated :
. Continue with paragraph 1.C.(2)(a)b until end of detailed inspection.
- If structure holes are elongated :
. Ref. SRM 57-20-45.
. Continue with paragraph 1.C.(2)(a)b until end of detailed inspection.

b If B-nuts are not loosened :
- Do clearance and damage check (Ref. 20-23-14, P. Block 1 or 20-23-11, P. Block 1).
- Replace or repair damaged parts (Ref. 20-23-11, P. Block 1).
- Reinstall parts (pipes, clamps etc.) which were removed.
- Reinstall the shutoff valves if removed (Ref. 29-11-33, P. Block 401).
- Realign/reposition parts (pipes, clamps etc.) :
. Obey clearance requirements (Ref. 20-23-14, P. Block 1).
. Prepare B-nut tightening to get stress-free installation.
- Retighten involved B-nuts (1) and (2) Ref. 20-23-11, P. Block 1). This is only necessary in case of prior findings, for example loosened B-nut, structure hole elongation, part damages or insufficient clearance.



Inspection Area
(Sheet 1/2)
Figure 601



BM5 29 11 33 6 AAMJ 00

NOTE:

INSPECTION AREA

(1) AIR PRESSURE LINE ON L WING ONLY

Inspection Area
(Sheet 2/2)
Figure 601

(3)Close-Up
  (a)By access doors 575BB (675BB), 575CB (675CB), tighten clamp blocks.
  (b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
  (c)Close access doors 571DB (671DB), 147AL, 575BB (675BB), 575CB (675CB) and 575DB (675DB).
  (d)Remove access platforms.
  (e)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
  (f)Remove safety clips and close circuit breakers 4GE, 101GK, 1GL and 4GE, 1GL, 6GL, 7GX.
  (g)Remove warning notices.

MANIFOLD - SERVO CONTROLS, G
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F.	Lockwire
G.	Plastic or Wooden Scraper
H. 97A29102090000	Bobbin and Ring Installation Tool
J. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
K. Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 20-23-21, P. Block 1	Hydraulic Bobbins
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 27-14-11, P. Block 401	Selector Valve - Servo Controls
- 27-14-18, P. Block 401	Pressure Switch - Servo Controls
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (FLAPS)
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 29-22-11, P. Block 401	Green/Blue Power Transfer Unit
- 29-23-11, P. Block 401	Green/Yellow Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

2. Procedure

A. Job Set-Up
(1)On overhead panel 427VU in flight compartment :
(a)Make certain that Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).

(b)Display a warning notice prohibiting pressurization and use of Green hydraulic system.

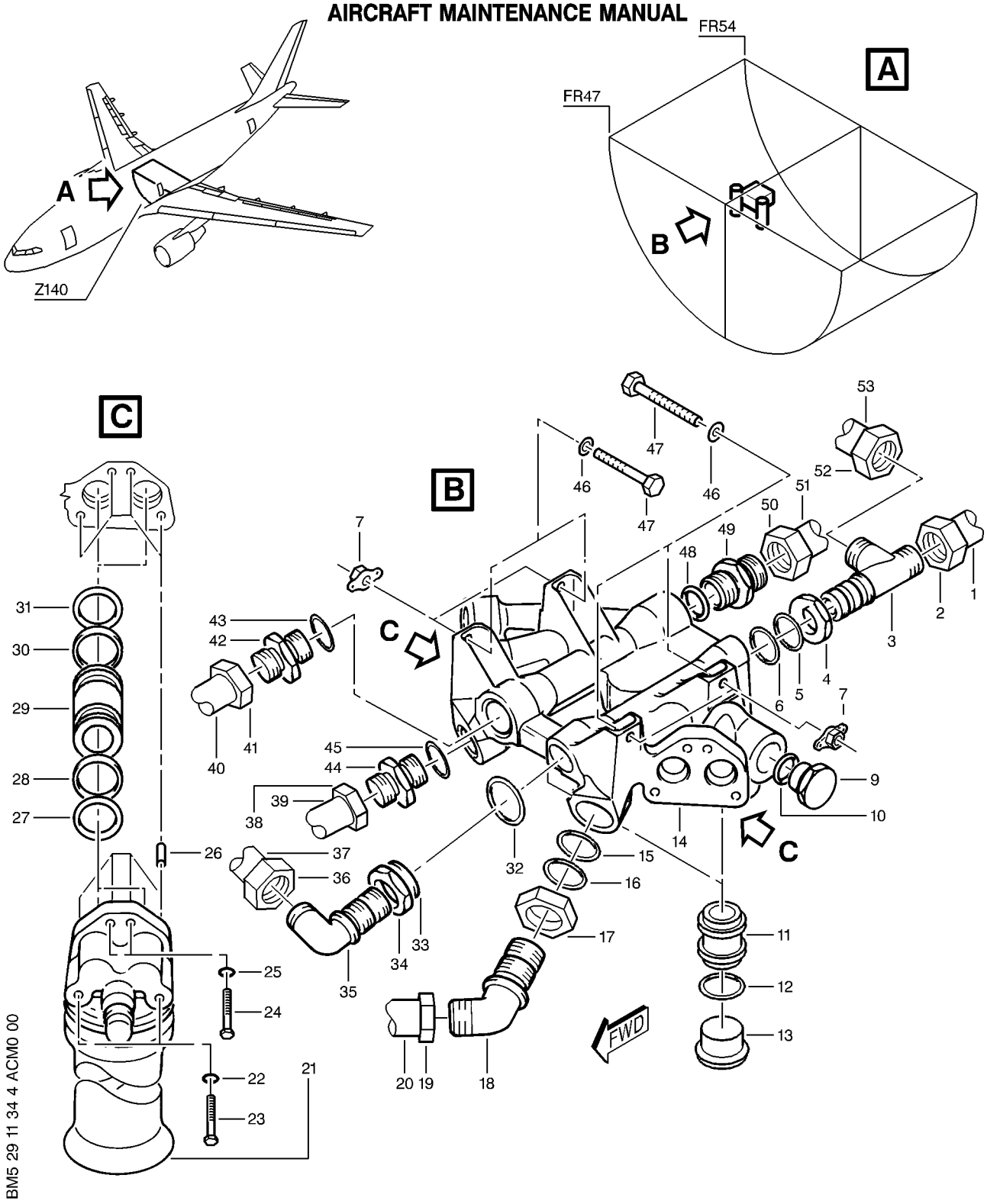
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Install access platform at zone 140.
(6)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(7)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Place container under reservoir to be drained and place absorbent material around unions.
(9)Drain Green hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(10)Disconnect isolation coupling of Power Transfer Unit (PTU) (Ref. 29-22-11, P. Block 401), (Ref. 29-23-11, P. Block 401).
(11)Remove selector valve (Ref. 27-14-11, P. Block 401).
(12)Remove pressure switch (Ref. 27-14-18, P. Block 401).

B. Removal
(Ref. Fig. 401)
(1)Loosen pipe end-fitting (2) and disconnect pipe (1) from tee union (3).
(2)Loosen pipe end-fitting (52) and disconnect pipe (53) from tee union (3).
(3)Loosen pipe end-fitting (19) and disconnect pipe (20) from elbow union (18).
(4)Loosen pipe end-fitting (36) and disconnect pipe (37) from elbow union (35).
(5)Loosen pipe end-fitting (38) and disconnect pipe (39) from union (44).
(6)Loosen pipe end-fitting (41) and disconnect pipe (40) from union (42).
(7)Loosen pipe end-fitting (50) and disconnect pipe (51) from union (49).
(8)Hold manifold (14) and remove bolts (47), washers (46) and nuts (7). Remove manifold (14).
(9)Install blanking plugs on disconnected line ends and manifold ports.

C. Preparation of Replacement Component
CAUTION : WHEN REMOVING THE BOBBINS, GREAT CARE SHOULD BE TAKEN NOT TO DAMAGE THEM. IT IS RECOMMENDED TO USE SPECIAL TOOL 97A29102090000.
(1)Remove parts which are attached to removed manifold (14).
(a)Remove filters (21).
1 Cut, remove and discard lockwire.
2 Remove bolts (23) and (24), washers (22) and (25) and remove filters (21).



G Servo Controls Manifold
Figure 401

3 Remove and discard seals (27), packings (31) and O-rings (28) and (30) from bobbins (29) (Ref. 20-23-21, P. Block 1).

4 Remove inserts (26).

(b) Put bobbins (29) into plastic bags to keep them clean.

(c) Install blanking plugs in open ports of all removed components.

(d) Remove elbow union (18) and nut (17) from manifold (14) and discard packings (16) and (15).

(e) Remove elbow union (35) and nut (34) from manifold (14) and discard packings (32) and (33).

(f) Remove union (44) from manifold (14) and discard packing (45).

(g) Remove union (42) from manifold (14) and discard packing (43).

(h) Remove union (49) from manifold (14) and discard packing (48).

(j) Remove tee union (3) and nut (4) from manifold (14) and discard packings (5) and (6).

(k) Remove caps (13) and valves (11) from manifold (14) and discard packings (12).

(l) Remove cap (9) from manifold (14) and discard packing (10).

(2) Install removed parts on replacement manifold (14). (Ref. Fig. 401).

(a) Remove blanking plugs from manifold (14) and components.

(b) Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.

(c) Put new packings (5) and (6) in position on tee union (3). Install tee union (3) and tighten nut (4) on manifold (14).

(d) Put new packings (15) and (16) in position on elbow union (18). Install elbow union (18) and tighten nut (17) on manifold (14).

(e) Put new packings (32) and (33) in position on elbow union (35). Install elbow union (35) and tighten nut (34) on manifold (14).

(f) Put new packing (45) in position on union (44). Install and tighten union (44) on manifold (14).

(g) Put new packing (43) in position on union (42). Install and tighten union (42) on manifold (14).

(h) Put new packing (48) in position on union (49). Install and tighten union (49) on manifold (14).

NOTE : Make sure that you install the square-section seal on the end of the bobbins without the identification groove.

NOTE : Make sure that you install the bobbins so that the identification groove is in the manifold.

(j) Install filters (21).

1 Put new seals (27), packings (31) and O-rings (28) and (30) in position on bobbins (29).

2 Install bobbins (29) in ports of manifold (14) (Ref. 20-23-21, P. Block 1).

3 Install inserts (26).

4 Install filters (21). Install bolts (23) and (24) and washers (22) and (25). Tighten bolts (23) and (24) and safety with lockwire.

(k) Install packing (10) and install and tighten cap (9).

R (l) Installation of non-return valves (11).

R (Ref. Fig. 402).

R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE

R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO

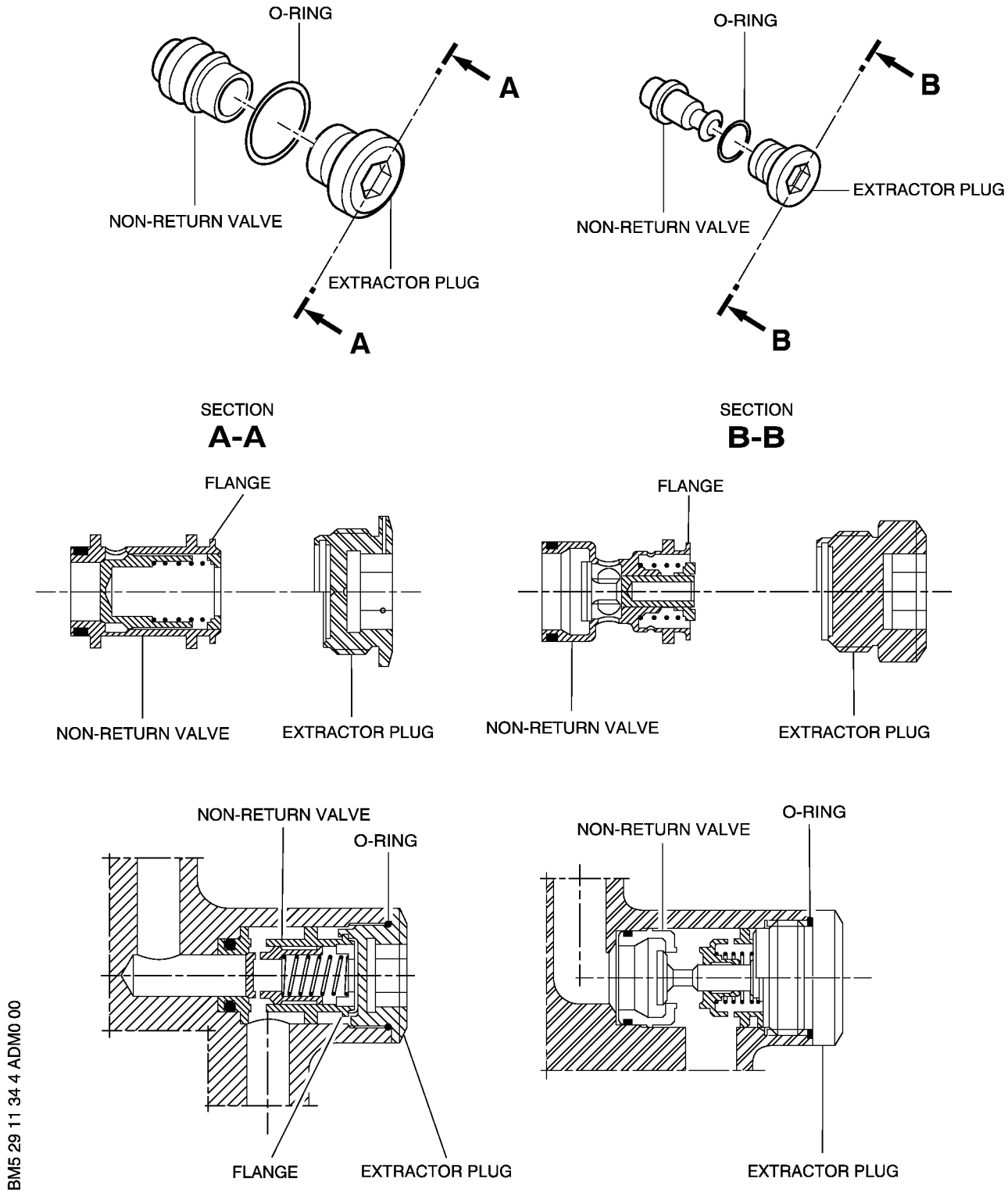
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.

R 1 Put new O-rings (12) in position on extractor plugs (13).
R 2 Install extractor plugs (13) on non-return valves (11).
R 3 Install non-return valve/extractor plug assemblies on manifold (14).
R 4 TORQUE extractor plugs (13) to between 9.7 and 10.7 m.daN (859 and 947 lbf.in.) (Ref. 20-23-12, P. Block 1).

D. Installation
(Ref. Fig. 401)
(1)Remove sealant from contact surface of manifold (14) and aircraft structure with a plastic or wooden scraper.
(2)Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.
(3)Put manifold (14) in position on aircraft.
(a)Install bolts (47), washers (46) and nuts (7).
(b)Tighten nuts (7) and safety with lockwire.
(4)Apply a layer of SEALANTS (Material No. 09-018) to contact surface of manifold (14).
(5)Remove blanking plugs from pipe connections.
(6)Connect pipe (1) to tee union (3). Tighten pipe end-fitting (2).
(7)Connect pipe (53) to tee union (3). Tighten pipe end-fitting (52).
(8)Connect pipe (20) to elbow union (18). Tighten pipe end-fitting (19).
(9)Connect pipe (37) to elbow union (35). Tighten pipe end-fitting (36).
(10)Connect pipe (39) to union (44). Tighten pipe end-fitting (38).
(11)Connect pipe (40) to union (42). Tighten pipe end-fitting (41).
(12)Connect pipe (51) to union (49). Tighten pipe end-fitting (50).
(13)Install pressure switch (Ref. 27-14-18, P. Block 401).
(14)Install selector valve (Ref. 27-14-11, P. Block 401).

E. Tests
(1)Remove safety clips and tags and close these circuit breakers : 1CB, 2CB, 1GQ, 1GR, 1GL, 6GL and 4GE.
(2)Make certain that fluid level in Green hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Pressurize Green hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Bleed the Green hydraulic system (Ref. 29-00-00, P. Block 401).
(5)Visually check for hydraulic fluid leakage at the various line connections.
(6)Check for air leakage, using soapy water and direct reading pressure gage.
(7)Check that quantity transmitter direct reading gage and quantity indicator in flight compartment read same indication.
(8)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(9)Carry out an operational test of the hydraulic actuation and power transmission (flaps) (Ref. 27-54-00, P. Block 501).
(10)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).
(11)Carry out an operational test of the servo control selector valve (Ref. 27-14-11, P. Block 401).
(12)Carry out an operational test of the servo control pressure switch (Ref. 27-14-18, P. Block 401).

F. Close-up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Remove access platform.
(5)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Typical Non-Return Valve and Extractor Plug Installation
Figure 402

R

ENGINE - DRIVEN PUMP CASE DRAIN FILTERS - SERVICING

WARNING : BEFORE ATTEMPTING MAINTENANCE PROCEDURES ON ENGINE MAKE CERTAIN THAT THE RELEVANT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

1. Reason for the Job

Replacement of Filter Element

2. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Container
C.	Lockwire - Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in).
D. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-00-00, P. Block 301	General Servicing
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

3. Procedure

(Ref. Fig. 301)

A. Job Set-Up

(1) Depressurize concerned hydraulic system (Ref. 29-14-00, P. Block 301).

(2) Depressurize concerned hydraulic reservoir system (Ref. 29-14-00, P. Block 301).

(3) As applicable display a warning notice on Green, Blue or Yellow system ground connector prohibiting pressurization of reservoir and hydraulic system.

(4) On HYD PWR panel 427VU, install warning notice prohibiting operation of hydraulic system.

(5) For Yellow case drain filter servicing, in zone 812 (Frame 54) display warning notice prohibiting operation of hand pump (293085).

(6) Open, safety and tag the following circuit breakers :

	PANEL	SERVICE	IDENT.	LOCATION
R		ENGINE 1		
R		Green No.1 filter		

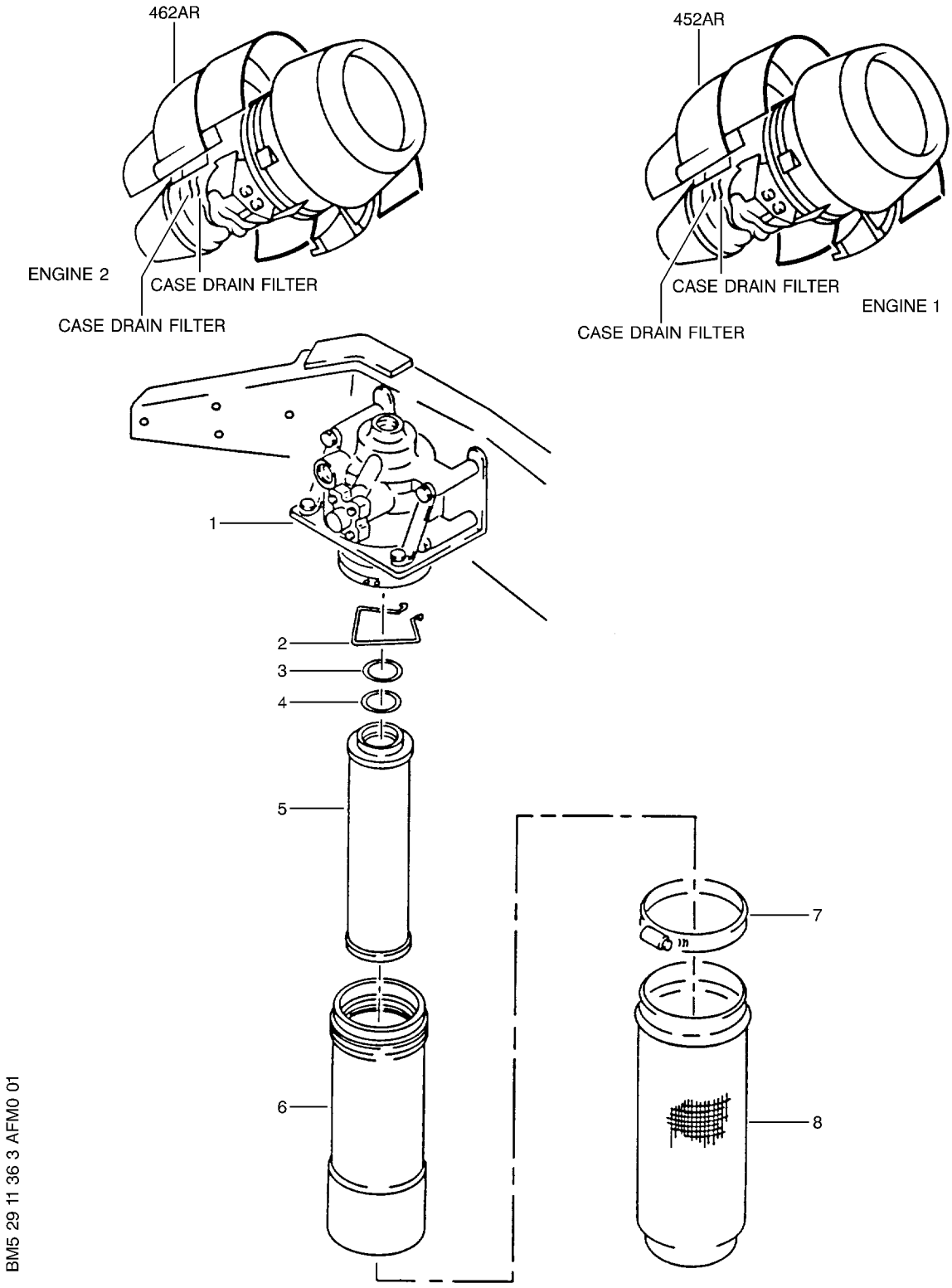
	PANEL	SERVICE	IDENT.	LOCATION
R	133VU	ELEC PUMPS/WARN	4GE	331/V60
R	133VU	ENG 1/PUMP CTL/G	99GK	331/V58
R		Blue filter		
R	133VU	ENG 1/PUMP CTL/B	31GJ	331/V57
R	133VU	PTU CTL/G/B	1GL	332/U59
R		ENGINE 2		
R		Green No.2 filter		
R	133VU	ELEC/PUMPS/WARN	4GE	331/V60
R	133VU	ENG 2/PUMP CTL/G	100GK	332/U58
R		Yellow filter		
R	133VU	ENG 2/PUMP CTL/Y	1GD	332/U57
R	133VU	PTU CTL/G/Y	6GL	332/U60
R	133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
R	133VU	RAT/TEST	1GF	331/V59
R	101VU	ELEC/HYD/PUMP	23GX	GEN2/B8

(7)Open fan cowl door 436AR (446AR) (Ref. 71-13-00, P. Block 301).
(8)Open thrust reverser cowl door 452AR (462AR) (Ref. 71-13-00, P. Block 301).
(9)Install a container under case drain filter element to be removed.

B. Removal
(Ref. Fig. 301)
(1)Loosen band clamp (7) attaching insulation blanket and remove blanket (8) and clamp (7).
(2)Cut and remove lockwire from filter head (1).
(3)Cut and remove lockwire between the two bowls.
(4)Unscrew and remove bowl (6) with filter element (5).
(5)Remove clip (2) retaining filter element (5). Remove and discard packing (4).
(6)Remove filter element (5) from bowl. Discard O-ring (3).

(7)Examine the filter element to find the causes of the contamination. If you find metal particles in the filter element, you must do a check of the related hydraulic system after operation of the engine pump in possible cavitation condition (Ref. 29-00-00, P. Block 301).

C. Installation
(Ref. Fig. 301)
(1)Clean filter element (5), dry it using clean compressed air.
CAUTION : INSTALL NEW O-RING (3) AND NEW PACKING (4). BEFORE INSTALLATION, COAT O-RING (3), PACKING (4) AND BOWL THREAD WITH HYDRAULIC FLUID (MATERIAL No. 02-003).
(2)Install filter element (5) into bowl (6) and secure with retaining clip (2).



Case Drain Filter Element
Figure 301

R

(3)Position bowl and filter element under filter head (1) and TORQUE to between 180 and 240 lbf.in. (2 and 2.7 m.daN).
(4)Wirelock bowl.
(5)Slide band clamp (7) and insulation blanket (8) over filter assembly and tighten clamp.
(6)Wirelock the two bowls together.
(7)Push in clogging indicator if protruding.

D. Tests
Filter shall be thoroughly checked for leakage by dry motoring (Ref. 71-00-00, P. Block 501).

E. Close-Up
(1)Remove safety clips and tags and close circuit breakers.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close thrust reverser cowl doors 452AR (462AR) (Ref. 71-13-00, P. Block 301).
(4)Close fan cowl door 436AR (446AR) (Ref. 71-13-00, P. Block 301).
(5)Check hydraulic fluid level in reservoirs. Top up, if required (Ref. 12-12-29, P. Block 1).
(6)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

ENGINE - DRIVEN PUMP CASE DRAIN FILTERS - SERVICING

WARNING : BEFORE ATTEMPTING MAINTENANCE PROCEDURES ON ENGINE MAKE CERTAIN THAT THE RELEVANT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

1. Reason for the Job

Replacement of Filter Element

2. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Container
C.	Lockwire - Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in).
D. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

3. Procedure

(Ref. Fig. 301)

A. Job Set-Up

(1) Depressurize concerned hydraulic system (Ref. 29-14-00, P. Block 301).

(2) Depressurize concerned hydraulic reservoir system (Ref. 29-14-00, P. Block 301).

(3) As applicable display a warning notice on Green, Blue or Yellow system ground connector prohibiting pressurization of reservoir and hydraulic system.

(4) On HYD PWR panel 427VU, install warning notice prohibiting operation of hydraulic system.

(5) For Yellow case drain filter servicing, in zone 812 (Frame 54) display warning notice prohibiting operation of hand pump (293085).

(6) Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
	- ENGINE 1 Green No.1 filter		
133VU	ELEC PUMPS/WARN	4GE	331/V60

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1/PUMP CTL/G	99GK	331/V58
	- Blue filter		
133VU	ENG 1/PUMP CTL/B	31GJ	331/V57
133VU	PTU CTL/G/B	1GL	332/U59
	- ENGINE 2		
	Green No.2 filter		
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 2/PUMP CTL/G	100GK	332/U58
	Yellow filter		
133VU	ENG 2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	RAT/TEST	1GF	331/V59
101VU	ELEC/HYD/PUMP	23GX	GEN2/B8

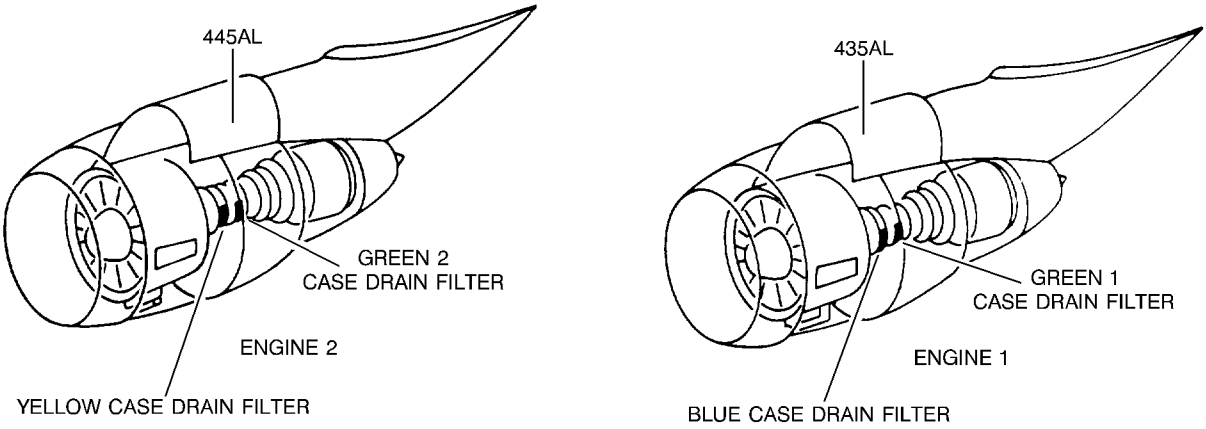
(7)Open fan cowl door 435AL (445AL) (Ref. 71-13-00, P. Block 301).
(8)Open thrust reverser cowl door 451AL (461AL) (Ref. 71-13-00, P. Block 301).
(9)Install a container under case drain filter element to be removed.

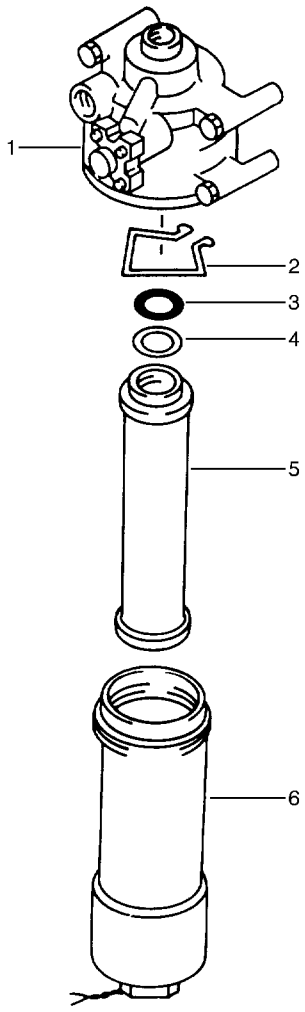
B. Removal
(1)Cut and remove lockwire from filter head (1).
(2)Unscrew and remove bowl (6) with filter element (5).
(2)Remove clip (2) retaining filter element (5).
(3)Remove filter element (5) from bowl. Discard O-ring (3) and packing (4).

C. Installation
(1)Clean filter element (5), dry it using clean compressed air.
R CAUTION : INSTALL A NEW O-RING (3) AND NEW PACKING (4).
R BEFORE INSTALLATION, COAT O-RING (3), PACKING (4) AND BOWL THREAD WITH HYDRAULIC FLUID (MATERIAL No. 02-003).
(2)Install filter element (5) into bowl (6) and secure with retaining clip (2).
(3)Position bowl and filter element under filter head (1) and TORQUE to between 180 and 240 lbf.in. (2 and 2.7 m.daN).
(4)Wirelock bowl.
(5)Push in clogging indicator if protruding.

D. Tests
Filter shall be thoroughly checked for leakage during dry motoring (Ref. 71-00-00, P. Block 501).

E. Close-Up





BM5 29 11 36 3 AJM0 02

Case Drain Filter Element
Figure 301

(1)Remove safety clips and tags and close circuit breakers.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (3)Close thrust reverser cowl doors 451AL (461AL) (Ref. 71-13-00,
R P. Block 301).
R (4)Close fan cowl door 435AL (445AL) (Ref. 71-13-00, P. Block 301).
(5)Check hydraulic fluid level in reservoirs. Top up, if required (Ref. 12-12-29, P. Block 1).
(6)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

ENGINE - DRIVEN PUMP CASE DRAIN FILTERS - REMOVAL/INSTALLATION

WARNING : BEFORE ATTEMPTING MAINTENANCE PROCEDURES ON ENGINE MAKE CERTAIN THAT THE RELEVANT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

1. Reason for the Job

Replacement of Case Drain Filter Assembly.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Container
B. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
C.	Warning Notices
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors
- 78-30-00, P. Block 1	Thrust Reverser Door

3. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1) Depressurize concerned hydraulic system (Ref. 29-14-00, P. Block 301).

(2) Depressurize concerned hydraulic system reservoir (Ref. 29-14-00, P. Block 301).

(3) As applicable display a warning notice on Green, Blue or Yellow system ground connector prohibiting pressurization of reservoir and hydraulic system.

(4) On HYD PWR panel 427VU, display a warning notice prohibiting operation of hydraulic system.

(5) For Yellow case drain filter servicing, in zone 812 (FR 54) display a warning notice prohibiting operation of hand pump (293085).

(6) Open, safety and tag the following circuit breakers :

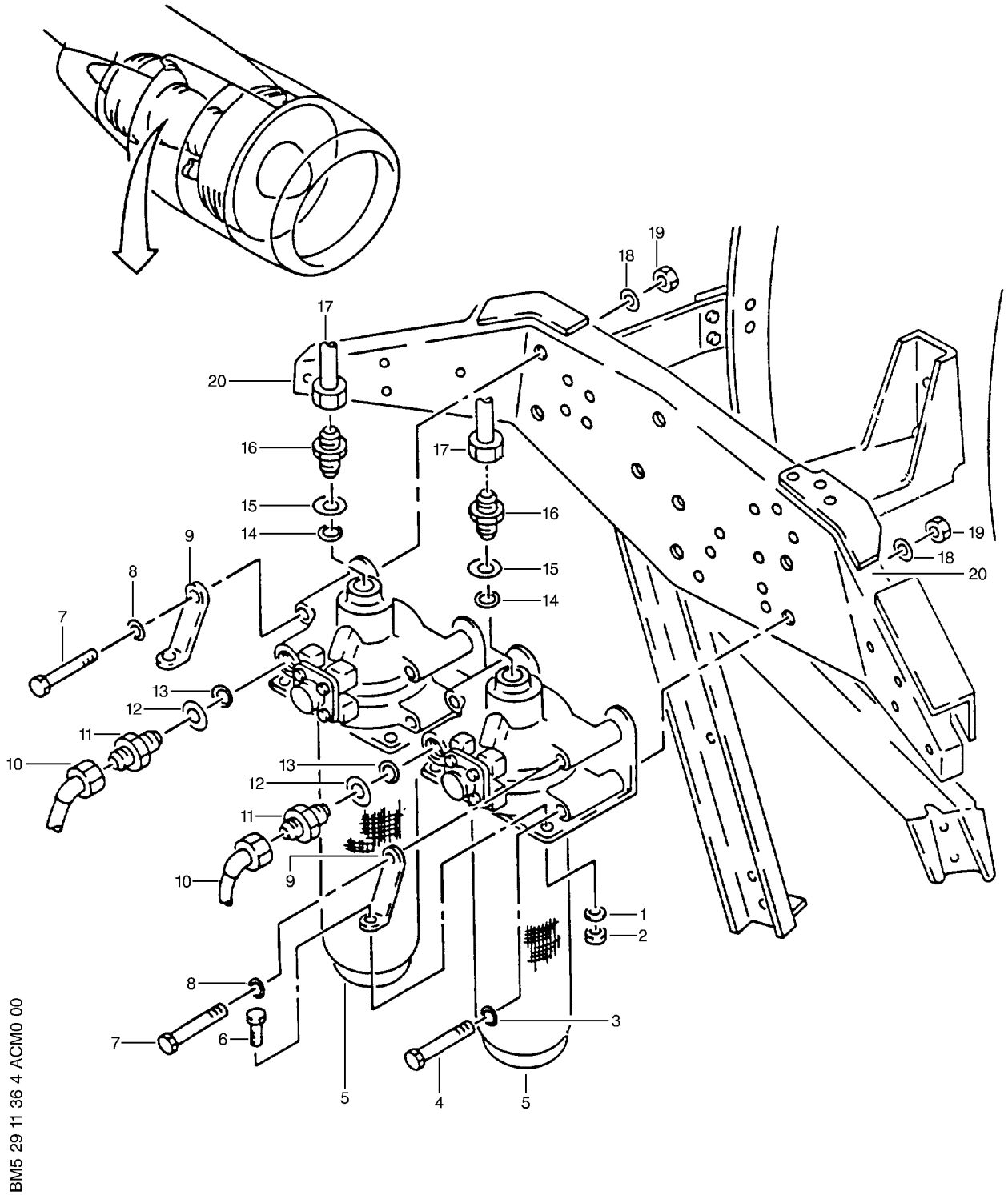
	PANEL	SERVICE	IDENT.	LOCATION
R		ENGINE 1		
R		Green filter No. 1		
R	133VU	ELEC PUMPS/WARN	4GE	331/V60
R	133VU	ENG 1/PUMP CTL/G	99GK	331/V58
R		Blue filter		

	PANEL	SERVICE	IDENT.	LOCATION
R	133VU	ENG 1/PUMP CTL/B	31GJ	331/V57
R	133VU	PTU CTL/G/B	1GL	332/U59
R		ENGINE 2		
R		Green filter No. 2		
R	133VU	ELEC/PUMPS/WARN	4GE	331/V60
R	133VU	ENG 2/PUMP CTL/G	100GK	332/U58
R		Yellow filter		
R	133VU	ENG 2/PUMP CTL/Y	1GD	332/U57
R	133VU	PTU CTL/G/Y	6GL	332/U60
R	133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
R	133VU	RAT/TEST	1GF	331/V59
R	101VU	ELEC/HYD/PUMP	23GX	GEN2/B8

(7)Open fan cowl door 452AR (462AR) (Ref. 71-13-00, P. Block 301).
(8)Open thrust reverser doors (Ref. 78-30-00, P. Block 1).
(9)Install a container under case drain filter assembly to be removed.

B. Removal
(Ref. Fig. 401)
(1)Disconnect hoses (10) and (17) from unions (11) and (16) and install protective covers on hoses.
(2)Remove unions (11) and (16) and install protective covers on filter assembly ports.
Remove and discard packings (14) and (13), and O-rings (12) and (15).
(3)Remove screws (7), bolts (6), nuts (2) and (19), and washers (1), (8) and (18) attaching angle brackets (9) to filter assembly (5) and remove brackets (9).
(4)Remove screws (4), washers (3) and (18), and nuts (19) attaching filter assembly (5) with insulation blanket assembly (20) to engine bracket and remove filter assembly.

C. Installation
(Ref. Fig. 401)
(1)Install filter assembly with insulation blanket using screws (4), washers (3) and (18), and nuts (19).
Tighten screws (4) fingertight only.
(2)Install angle brackets (9) with bolts (6), screws (7), washers (1), (8) and (18), and nuts (2) and (19).
Tighten screws (7) and bolts (6) fingertight only.
(3)TORQUE screws (4) and (7) to between 50 and 70 lbf.in. (0.57 and 0.78 m.daN).
(4)TORQUE bolts (6) to between 20 and 25 lbf.in. (0.23 and 0.28 m.daN).
(5)Remove protective covers from filter assembly ports.
CAUTION : INSTALL NEW O-RINGS (12) AND (15), AND NEW PACKINGS (13) AND (14).
LUBRICATE UNION THREADS (11) AND (16) WITH HYDRAULIC FLUID (MATERIAL No. 02-003).



Case Drain Filter Assembly
Figure 401

(6)Install unions (11) and (16) on filter assembly.
R TORQUE unions (11) and (16) to between 250 and 300 lbf.in. (2.83 and
R 3.38 m.daN).
(7)Remove protective covers from hoses (10) and (17) and connect hoses (10) and (17) to unions (11) and (16).
TORQUE hoses (10) and (17) to between 270 and 300 lbf.in. (3.06 and 3.38 m.daN).

D. Tests
Filter shall be thoroughly checked for leakage by dry motoring (Ref. 71-00-00, P. Block 501).

E. Close-Up
(1)Remove safety clips and tags and close circuit breakers.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close thrust reverser doors (Ref. 78-30-00, P. Block 1).
(4)Close fan cowl door 452AR (462AR) (Ref. 71-13-00, P. Block 301).
(5)Check hydraulic fluid level in reservoirs. Top up, if required (Ref. 12-12-29, P. Block 1).
(6)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

ENGINE - DRIVEN PUMP CASE DRAIN FILTERS - REMOVAL/INSTALLATION

WARNING : BEFORE ATTEMPTING MAINTENANCE PROCEDURES ON ENGINE MAKE CERTAIN THAT THE RELEVANT CIRCUIT BREAKERS ARE OPEN, SAFETIED AND TAGGED. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN DEATH ORSERIOUS INJURY TO PERSONNEL.

1. Reason for the Job

A. Replacement of Case Drain Filter Assembly

B. Replacement of Differential Pressure Indicator

2. Equipment and Materials

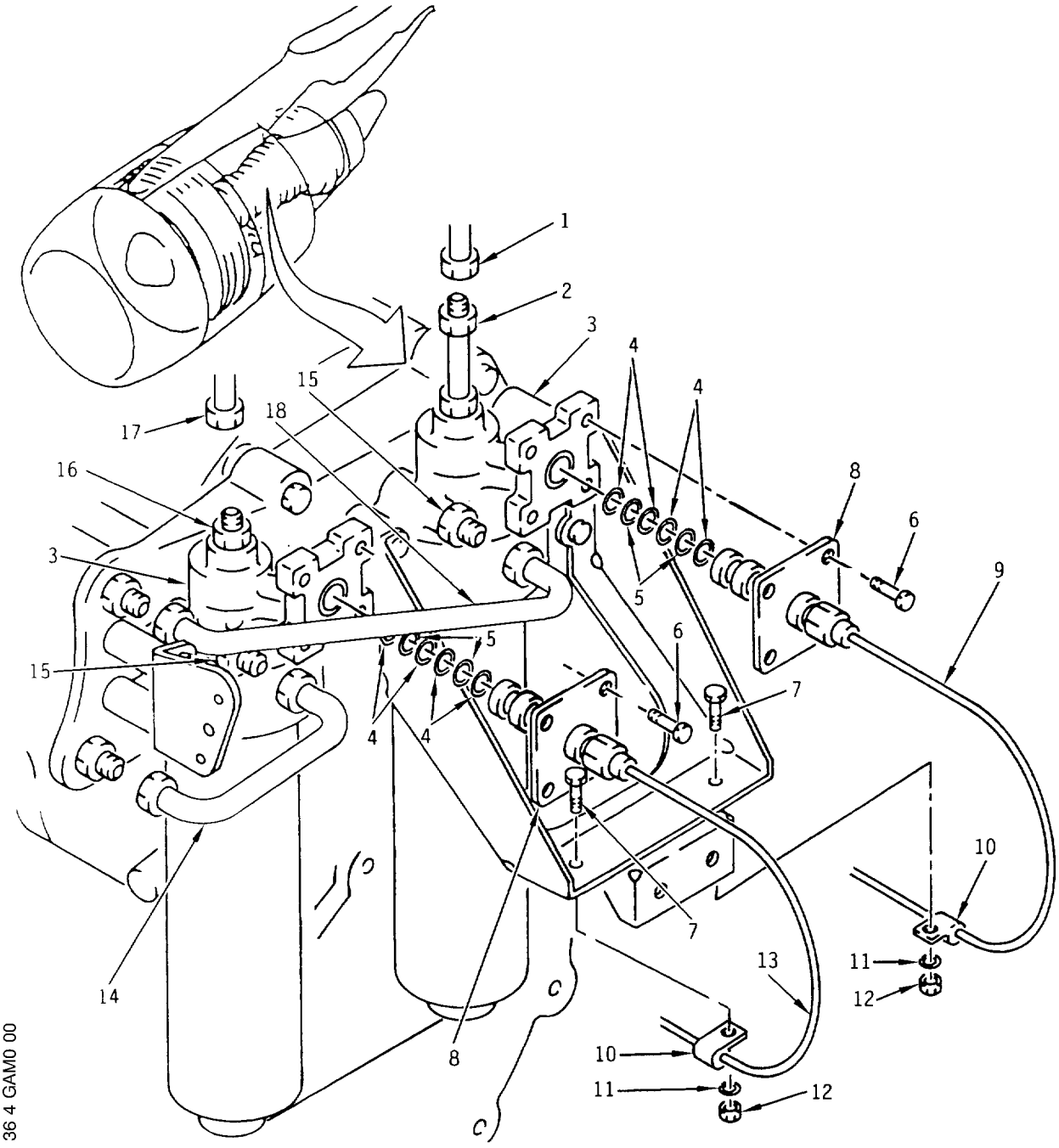
ITEM	DESIGNATION
A.	Warning Notices
B.	Container
C.	Lockwire - Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in).
D. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors
- 78-30-00, P. Block 1	Thrust Reverser

3. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)

A. Job Set-Up

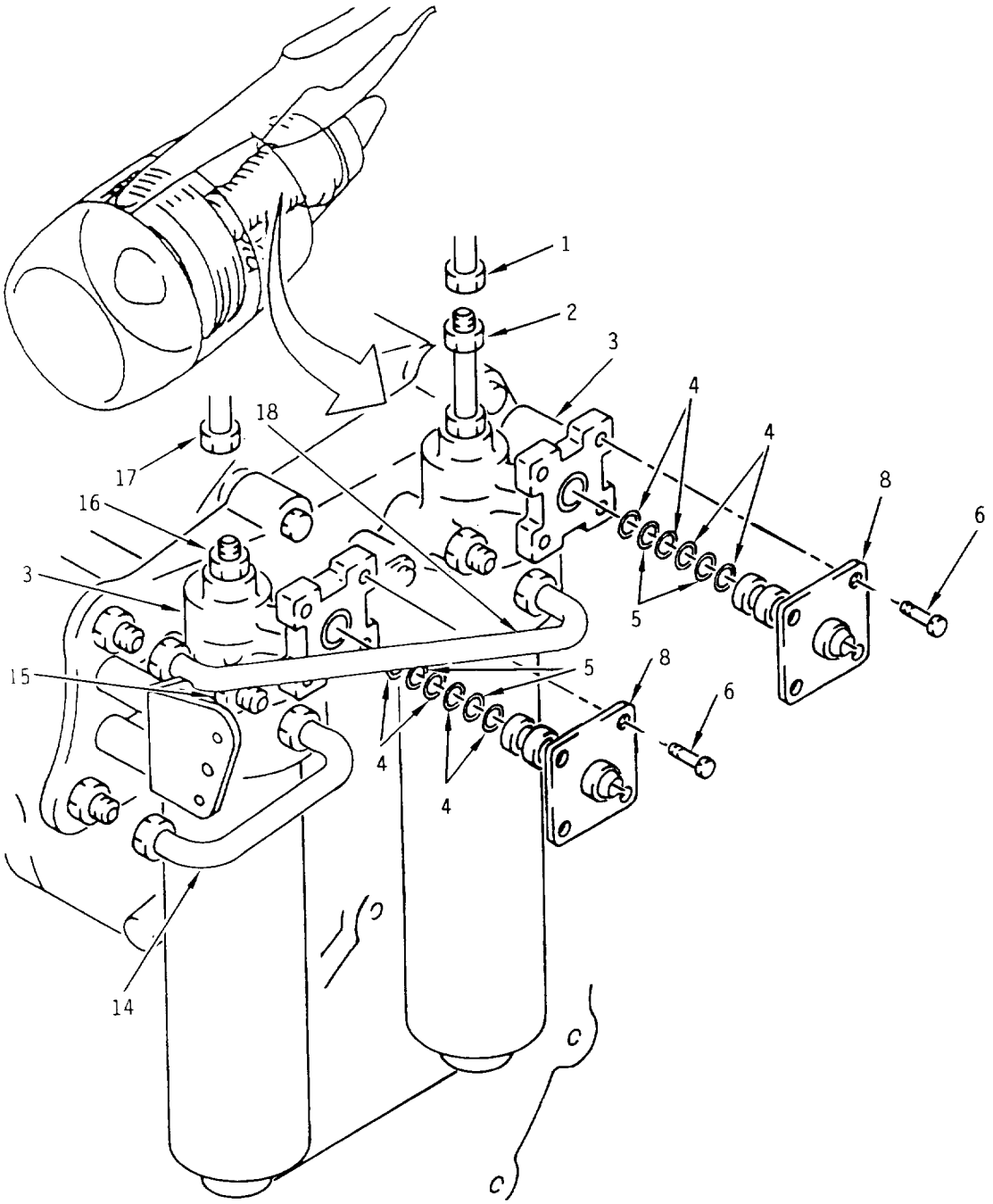
(1) Depressurize concerned hydraulic system (Ref. 29-14-00, P. Block 301).
(2) Depressurize concerned hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(3) As applicable display a warning notice on Green, Blue or Yellow system ground connector prohibiting pressurization of reservoir and hydraulic system.
(4) On HYD PWR panel 427VU, display a warning notice prohibiting operation of hydraulic system.
(5) For Yellow case drain filter servicing, in zone 812 (FR 54) display a warning notice prohibiting operation of hand pump (293085).
(6) Open, safety and tag the following circuit breakers :



BM5 29 11 36 4 GAM0 00

C2M-134-00

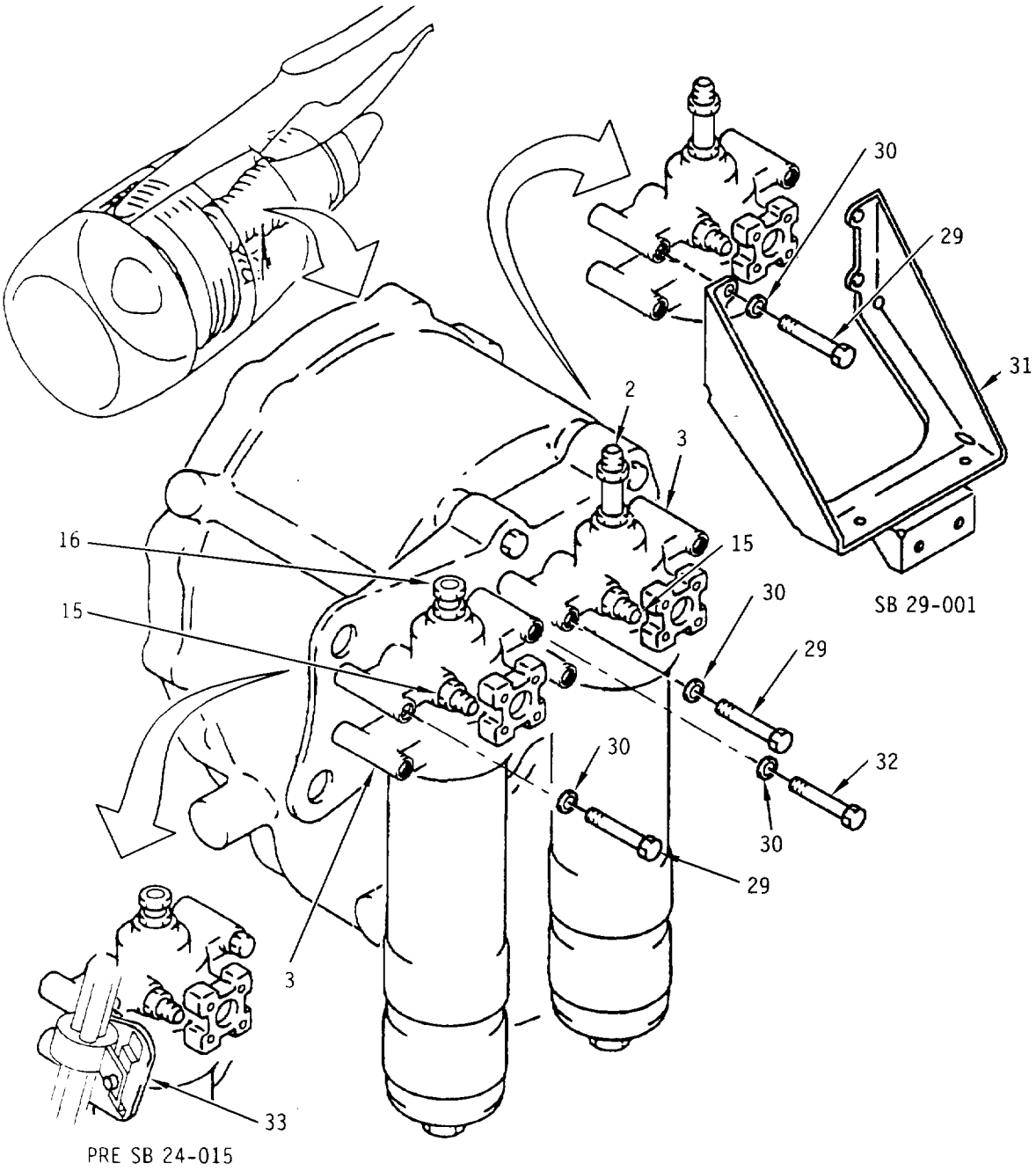
Case Drain Filter Tubes and Indicators
(Post SB 29-001)
Figure 401



BM5 29 11 36 4 GCM0 00

C2M-135-00

Case Drain Filter Tubes and Indicators
(Pre SB 29-001)
Figure 402



BM5 29 11 36 4 GEM0 00

C2M-136-00

Case Drain Filter Assembly
Figure 403

PANEL	SERVICE	IDENT.	LOCATION
	- ENGINE 1		
	Green filter No. 1		
133VU	ELEC PUMPS/WARN	4GE	331/V60
133VU	ENG 1/PUMP CTL/G	99GK	331/V58
	Blue filter		
133VU	ENG 1/PUMP CTL/B	31GJ	331/V57
133VU	PTU CTL/G/B	1GL	332/U59
	- ENGINE 2		
	Green filter No. 2		
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG 2/PUMP CTL/G	100GK	332/U58
	Yellow filter		
133VU	ENG 2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	RAT/TEST	1GF	331/V59
101VU	ELEC/HYD/PUMP	23GX	GEN2/B8

(7)Open fan cowl door 435AL (445AL) (Ref. 71-13-00, P. Block 301).
(8)Open thrust reverser doors (Ref. 78-30-00, P Block 1).
(9)Install a container under case drain filter assembly to be removed.

B. Removal
(1)Case drain filter assembly
(a)Disconnect the hydraulic tubes and hoses.
(Ref. Fig. 401, 402)
1 Disconnect hoses (1) and (17) from unions (2) and (16) on the top of the case drain filter assemblies (3).
2 Remove tube (14) from the tee on the bracket and from union (15) on the left case drain filter assembly (3).
3 Remove tube (18) from the tee on the bracket and from union (15) on the right case drain filter assembly (3).
(b)Disconnect the differential pressure indicators
(Ref. Fig. 401, 402)
1 Cut the lockwire on screws (6). Remove screws (6) that attach differential pressure indicators (8) to the case drain filter assemblies (3). Remove indicators (8). Remove and discard O-rings (5) and back-up rings (4).

Post SB 29-001

2 Remove clamps (10), screws (7), washers (11) and nuts (12) that attach indicator tube (9) or (13) to the bracket.

End of SB 29-001

(c)Cut the lockwire that attach the left and right filter bowls together.
(d)Remove the left case drain filter assembly.
(Ref. Fig. 403)

Pre SB 24-015

1 Remove bolts (29) and (32) and washers (30) that attach the case drain filter assembly (3) and bracket (33) to the support bracket. Remove the case drain filter assembly (3).

Post SB 24-015

2 Remove bolts (29) and (32) and washers (30) that attach the case drain filter assembly (3) to the support bracket. Remove the case drain filter assembly (3).

End of SB 24-015

3 Remove unions (15) and (16) from the case drain filter assembly (3).

(e)Remove the right case drain filter assembly
(Ref. Fig. 403)

Pre SB 29-001

1 Remove bolts (29) and washers (30) that attach the case drain filter assembly (3) to the support bracket. Remove the case drain filter assembly (3).

Post SB 29-001

2 Remove bolts (29) and washers (30) that attach the case drain filter assembly (3) and indicator tube bracket (31) to the support bracket. Remove the case drain filter assembly (3).

End of SB 29-001

3 Remove unions (2) and (15) from the case drain filter assembly (3).

(2)Differential pressure indicators
(Ref. Fig. 401, 402)

(a)Cut the lockwire on screws (6). Remove screws (6) that attach differential pressure indicators (8) to the case drain filter assemblies (3). Remove indicators (8). Remove and discard O-rings (5) and back-up rings (4).

Post SB 29-001

(b)Remove clamps (10), screws (7), washers (11) and nuts (12) that attach indicator tube (9) or (13) to the bracket (31).

End of SB 29-001

C. Installation

(1)Differential pressure indicators

CAUTION : INSTALL NEW O-RINGS (5) AND NEW BACK-UP RINGS (4). BEFORE INSTALLATION, COAT O-RINGS (5), BACK-UP RINGS (4) AND DIFFERENTIAL INDICATOR (8) WITH HYDRAULIC FLUID (MATERIAL NO. 02-003).

(Ref. Fig. 401, 403)

Post SB 29-001

(a)Attach indicator tube (9) or (13) to indicator tube bracket (31) with clamps (10), screws (7), washers (11) and nuts (12). TORQUE nuts (12) to between 20 and 25 lbf.in. (0.23 and 0.28 m.daN).

End of SB 29-001

(a)Install new back-up rings (4) and O-rings (5) on differential pressure indicators (8).

(b)Install differential pressure indicators (8) in the case drain filter assemblies (3) with screws (6). TORQUE screws (6) to between 50 and

70 lbf.in. (0.56 and 0.79 m.daN).

(c)Safety screws (6) with lockwire.

(2)Case drain filter assembly

(a)Installation of the right case drain filter asssembly
(Ref. Fig. 403)

1 Install union (15) on the case drain filter assembly (3). TORQUE union (15) to between 125 and 140 lbf.in. (1.41 and 1.58 m.daN).

2 Install union (2) on the top of the case drain filter assembly (3). TORQUE union (2) to between 125 and 140 lbf.in. (1.41 and 1.58 m.daN).

Pre SB 29-001

3 Install the case drain filter assembly (3) on the support bracket with bolts (29) and washers (30). TORQUE bolts (29) to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

Post SB 29-001

4 Install the case drain filter assembly (3) and indicator tube bracket (31) on the support bracket with bolts (29) and washers (30). TORQUE bolts (29) to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

5 Attach indicator tube (9) to the indicator tube bracket (31) with clamps (10), screws (7), washers (11) and nuts (12). TORQUE nuts (12) to between 20 and 25 lbf.in. (0.23 and 0.28 m.daN).

(b)Installation of the left case drain filter assembly
(Ref. Fig. 403)

1 Install union (15) on the case drain filter assembly (3). TORQUE union (15) to between 125 and 140 lbf.in. (1.41 and 1.58 m.daN).

2 Install union (16) on the top of the case drain filter assembly (3). TORQUE union (16) to between 125 and 140 lbf.in. (1.41 and 1.58 m.daN).

Pre SB 24-015

3 Install the case drain filter assembly (3) and the bracket (33) on the support bracket with bolts (29) and (32), and washers (30). TORQUE bolts (29) and (32) to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

Post SB 24-015

4 Install the case drain filter assembly (3) on the support bracket with bolts (29) and (32) and washers (30). TORQUE bolts (29) and (32) to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

End of SB 24-015

Post SB 29-001

5 Attach the indicator tube (13) to indicator tube bracket (31) with clamps (10), screws (7), washers (11) and nuts (12). TORQUE nuts (12) to between 20 and 25 lbf.in. (0.23 and 0.28 m.daN).

End of SB 29-001

(c)Safety the case drain filter bowls

1 Safety the left and right filter bowls together with lockwire.

(d)Install the differential pressure indicators
(Ref. Fig. 401, 403)

CAUTION : INSTALL NEW O-RINGS (5) AND NEW BACK-UP RINGS (4). BEFORE

INSTALLATION, COAT O-RINGS (5), BACK-UP RINGS (4) AND DIFFERENTIAL INDICATOR (8) WITH HYDRAULIC FLUID (MATERIAL NO. 02-003).

1 Install new back-up rings (4) and O-rings (5) on differential pressure indicators (8).

2 Install differential pressure indicators (8) in the case drain filter assemblies (3) with screws (6). TORQUE screws (6) to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

3 Safety screws (6) with lockwire.

(e) Attach the hydraulic tubes and hoses
(Ref. Fig. 401, 402)

1 Connect tube (18) to the tee on the bracket and to union (15) on the right case drain filter assembly (3). TORQUE tube (18) to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).

2 Connect tube (14) to the tee on the bracket and to union (15) on the left case drain filter assembly (3). TORQUE tube (14) to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).

3 Connect hoses (1) and (17) from the pylon to unions (2) and (16) on top of the case drain filter assemblies (3). TORQUE hoses (1) and (17) to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).

D. Tests

Filter shall be thoroughly checked for leakage during dry motoring (Ref. 71-00-00, P. Block 501).

E. Close-Up

(1) Remove safety clips and tags and close circuit breakers.

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3) Close thrust reverser doors (Ref. 78-30-00, P. Block 1).

(4) Close fan cowl door 435AL (445AL) (Ref. 71-13-00, P. Block 301).

(5) Check hydraulic fluid level in reservoirs. Top up, if required (Ref. 12-12-29, P. Block 1).

(6) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

PUMP DELIVERY FILTER 291048-291049 - SERVICING

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Reason for the Job
Replacement of filter element

2. Equipment and Materials

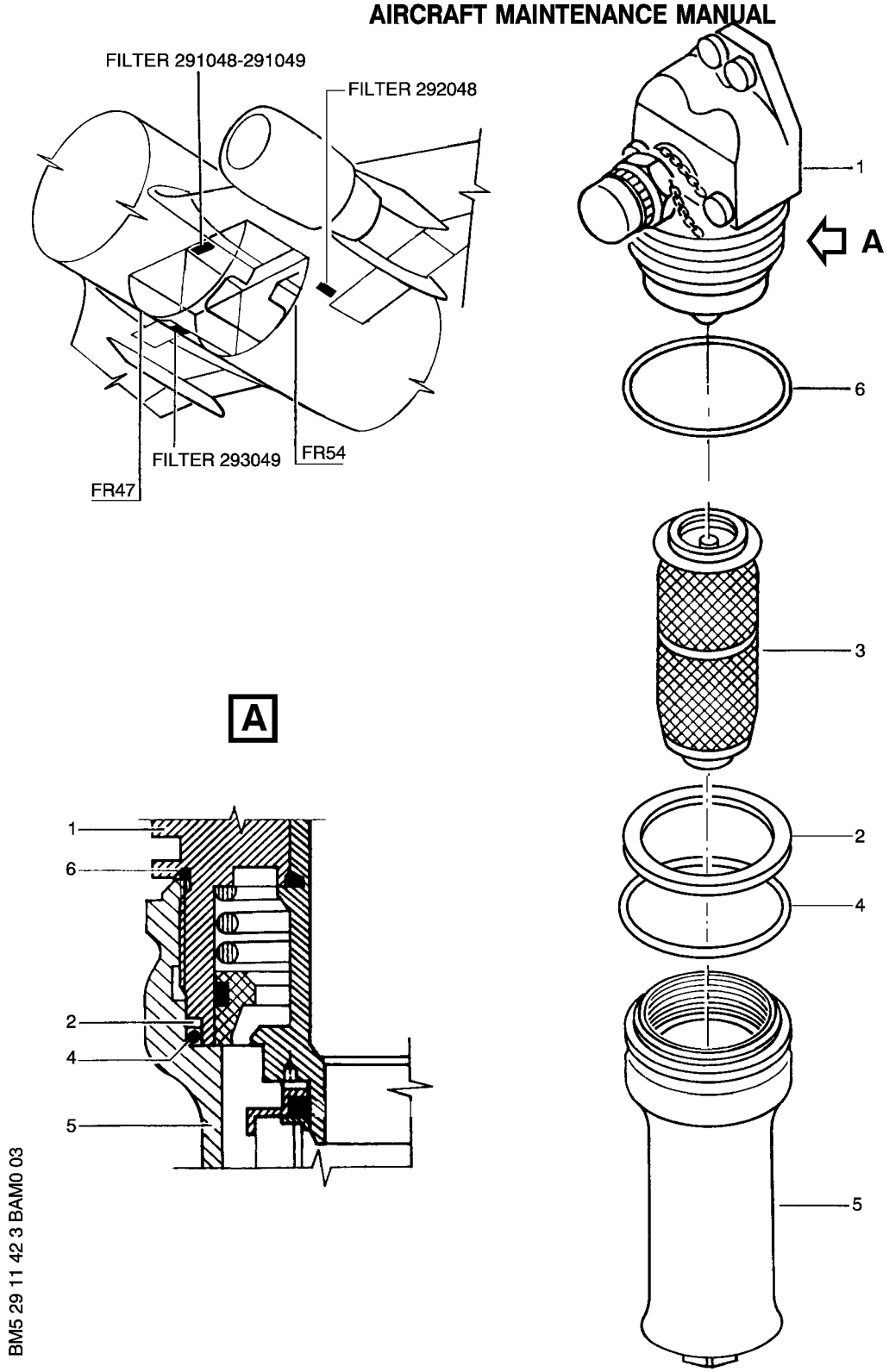
ITEM	DESIGNATION
A.	Compressed Air Source
B.	Access Platform, 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

3. Procedure
(Ref. Fig. 301)

A. Job Set-Up
(1)In flight compartment, on HYD PWR panel 427 VU, make certain that hydraulic power is in the following configuration.
(a)ELEC PUMPS pushbutton switch released (out)
(b)Yellow and Blue system PTU pushbutton switches released (out)
(c)Display a warning notice prohibiting pressurization of Green, Blue and Yellow hydraulic systems.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60

(3)Open main gear main door (Ref. 32-12-11, P. Block 301).
(4)Install access platform.
(5)Open access doors 571DB, 671DB and 147AL to ground connectors. Display a warning notice prohibiting pressurization.
(6)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(7)Depressurize hydraulic system reservoirs (Ref. 29-14-00, P. Block 301).



Filter - Replacement of Element
Figure 301

R

R B. Removal
R (1)Cut and remove lockwire between filter head (1) and bowl (5).
R (2)Unscrew bowl (5).
R (3)Discard O-ring (6) from filter head (1).
R (4)Discard O-ring (4) and back-up ring (2).
R (5)Remove filter element (3) from bowl (5) and discard it, if it is not of cleanable type.
R NOTE : If filter element (3) is re-usable and if it cannot be cleaned immediately after removal, immerse it in hydraulic fluid after having blanked its outlet port.

R C. Installation
R CAUTION : INSTALL NEW OR RECONDITIONED FILTER ELEMENT.
R FOR A RE-USABLE FILTER ELEMENT, CLEANING MUST BE PERFORMED IN AN ULTRASONIC TANK AND BE FOLLOWED BY A PERFORMANCE TEST. BEFORE INSTALLATION, NEW O-RINGS MUST BE COATED WITH HYDRAULIC FLUID.
R (1)Install new O-ring (4) and new back-up ring (2) on bowl (5).
R (2)Install new filter element (3) in bowl (5), or a filter element (3) previously cleaned then dried off with clean and dry compressed air.
R (3)Install new O-ring (6) on filter head (1).
R (4)Position bowl/filter element assembly under filter head (1).
R (5)Tighten bowl (5) home. MAXIMUM TORQUE : 4 m. daN (30 lbf.ft)
R (6)Wirelock bowl (5)
R (7)Press clogging indicator if protruding.

D. Test
(1)Pressurize hydraulic system reservoirs (Ref. 29-14-00, P. Block 301).
(2)Pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(3)Check filters for leakage.

R E. Close-Up
R (1)Check fluid level in hydraulic reservoir, top up if required (Ref. 12-12-29, P. Block 1).
R (2)Remove safety clips and tags and close circuit breakers 4GE, 1GL and 6GL.
R (3)Remove warning notices.
R (4)Close access doors 571DB, 671DB and 147AL.
R (5)Remove all ground handling and maintenance equipment standard and special tools together with ground power and replenishing equipment, all access equipment and miscellaneous items.
R (6)Close main gear main doors (Ref. 32-12-11, P. Block 301).

MANIFOLD STANDBY GENERATOR - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Container
B.	Circuit Breaker(s) Safety Clip(s)
C.	Warning Notices
D.	Access Platform 2.6 m (8 ft. 8 in.)
E.	Blanking Plugs/Covers
F.	Lockwire
G. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Reservoir Replenishing
- 20-28-11, P. Block 1	Electrical Bonding
- 24-24-52, P. Block 401	Selector Valve (33XE)
- 24-41-00, P. Block 301	AC External Power Control
- 24-41-00, P. Block 501	AC External Power Control
- 29-00-00, P. Block 401	General Hydraulic System Bleeding Procedure
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

2. Procedure

A. Job Set-Up

(1)On overhead panel 427VU in flight compartment :

- Place a warning notice prohibiting operation of Green hydraulic system.

(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC-BAT PICK UP AND OVHD ANN	1PE	D22
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL&/CARGO DOOR/PUMP	7GX	333/T51

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

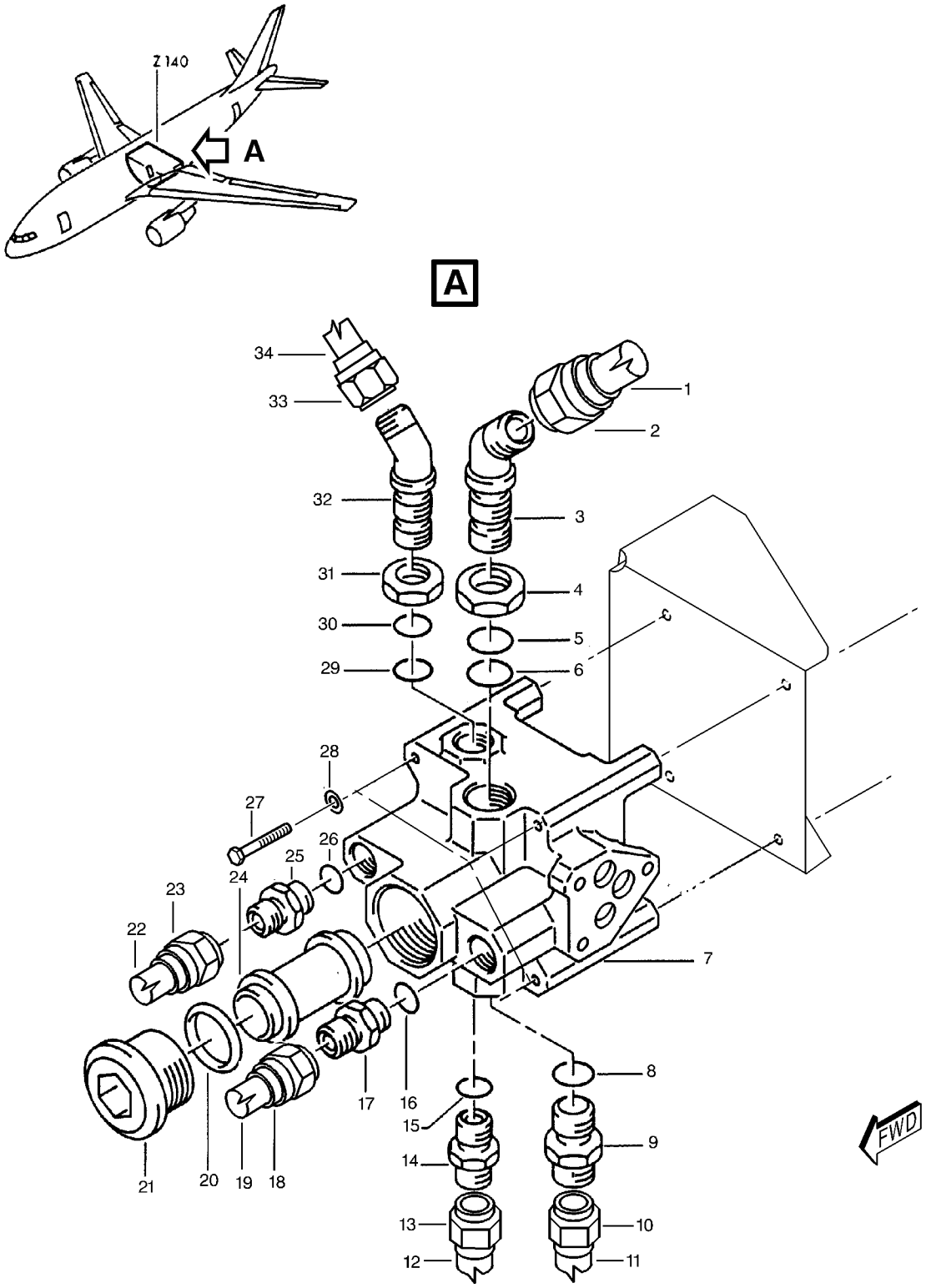
(4)Open access door 147AL to get access to Green ground connector.

(5)Place a warning notice on ground connector prohibiting pressurization of

Green hydraulic system.
(6)Open main gear doors (Ref. 32-12-11, P. Block 301).
(7)Install access platform at zone 140.
(8)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(9)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(10)Remove selector valve 33XE (Ref. 24-24-52, P. Block 401).
(11)Install container below the manifold to be removed.

B. Removal
(Ref. Fig. 401)
(1)Loosen pipe end-fitting (2) and disconnect pipe (1) from the elbow union (3).
(2)Loosen pipe end-fitting (10) and disconnect pipe (11) from union (9).
(3)Loosen pipe end-fitting (13) and disconnect pipe (12) from union (14).
(4)Loosen pipe end-fitting (18) and disconnect pipe (19) from union (17).
(5)Loosen pipe end-fitting (23) and disconnect pipe (22) from union (25).
(6)Loosen pipe end-fitting (33) and disconnect pipe (34) from elbow union (32).
(7)Install blanking plugs on disconnected line ends.

C. Preparation of Replacement Component
(1)Remove parts which are attached to removed manifold (7).
(a)Hold the manifold (7) and remove four screws (27) and four washers (28).
(b)Remove manifold (7) from support plate. If necessary remove pipes (1), (11), (12), (19), (22) and (34).
(c)Remove elbow union (3) and nut (4) from manifold (7) and discard packings (5) and (6).
(d)Remove union (9) and discard packing (8) from manifold.
(e)Remove union (14) and discard packing (15) from manifold.
(f)Remove union (17) and packing (16) from manifold.
(g)Remove union (25) and packing (26) from manifold.
(h)Remove elbow union (32) and nut (31) from manifold (7) and discard packings (30) and (29).
(i)Remove extractor plug (21) from manifold (7) and discard packing (20). Cut, remove and discard lockwire.
(j)Remove non-return valve (24) from manifold (7).
(k)Install blanking plugs and blanking covers on manifold ports.
(2)Install removed parts on replacement manifold (7).
(a)Remove blanking plugs and blanking covers from manifold (7) and components.
(b)Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.
NOTE : Do the electrical bonding of the manifold on the related screws (27) (Ref. 20-28-11, P. Block 1).
(c)Put new packings (5) and (6) in position on elbow union (3). Install the elbow union (3) and tighten the nut (4) on manifold (7). TORQUE elbow unions (3) and nuts (4) to between 7.29 and 7.40 m.daN (645 and 655 lbf.in.) (Ref. 20-23-12, P. Block 1).
(d)Put new packing (8) in position on union (9). Install and tighten union (9) on manifold (7).
TORQUE union (9) to between 7.29 and 7.40 m.daN (645 and 655 lbf.in.)



Manifold-Standby Generator
Figure 401

(Ref. 20-23-12, P. Block 1).

(e)Put new packing (15) in position on union (14). Install and tighten union (14) on manifold (7).
TORQUE union (14) to between 5.03 and 5.14 m.daN (445 and 455 lbf.in.) (Ref. 20-23-12, P. Block 1).

(f)Put new packing (16) in position on union (17). Install and tighten union (17) on manifold (7).
TORQUE union (17) to between 5.03 and 5.14 m.daN (445 and 455 lbf.in.) (Ref. 20-23-12, P. Block 1).

(g)Put new packing (26) in position on union (25). Install and tighten union (25) on manifold (7).
TORQUE union (25) to between 3.47 and 3.58 m.daN (307 and 317 lbf.in.) (Ref. 20-23-12, P. Block 1).

(h)Put new packings (30) and (29) in position on elbow union (32). Install the elbow union (32) and tighten the nut (31) on manifold (7).
TORQUE elbow union (32) and nut (31) to between 5.03 and 5.14 m.daN (445 and 455 lbf.in.) (Ref. 20-23-12, P. Block 1).

R (i)Installation of non-return valve (24).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-ring (20) in position on extractor plug (21).
R 2 Install extractor plug (21) on non-return valve (24).
R 3 Install non-return valve/extractor plug assembly on manifold (7).
R 4 TORQUE extractor plug (21) to between 9.7 and 10.7 m.daN (859 and 947 lbf.in.) (Ref. 20-23-12, P. Block 1).
R (j)Safety extractor plug (21) with lockwire (Ref. 20-11-11, P. Block 1).
R (k)Put manifold (7) in position on support plate.
R (l)Install the four screws (27) and the four washers (28) and tighten screws (27).

D. Installation
(Ref. Fig. 401)

(1)Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.

(2)Remove blanking plugs from pipe connections.

(3)Connect pipe (1) to elbow union (3). Tighten pipe end-fitting (2).
TORQUE pipe end-fitting (2) to between 4.8 and 5.3 m.daN (425 and 469 lbf.in.).

(4)Connect pipe (11) to union (9). Tighten pipe end-fitting (10).
TORQUE pipe end-fitting (10) to between 5.20 and 5.65 m.daN (460 and 500 lbf.in.).

(5)Connect pipe (12) to union (14). Tighten pipe end-fitting (13).
TORQUE pipe end-fitting (13) to between 7 and 7.68 m.daN (620 and 680 lbf.in.).

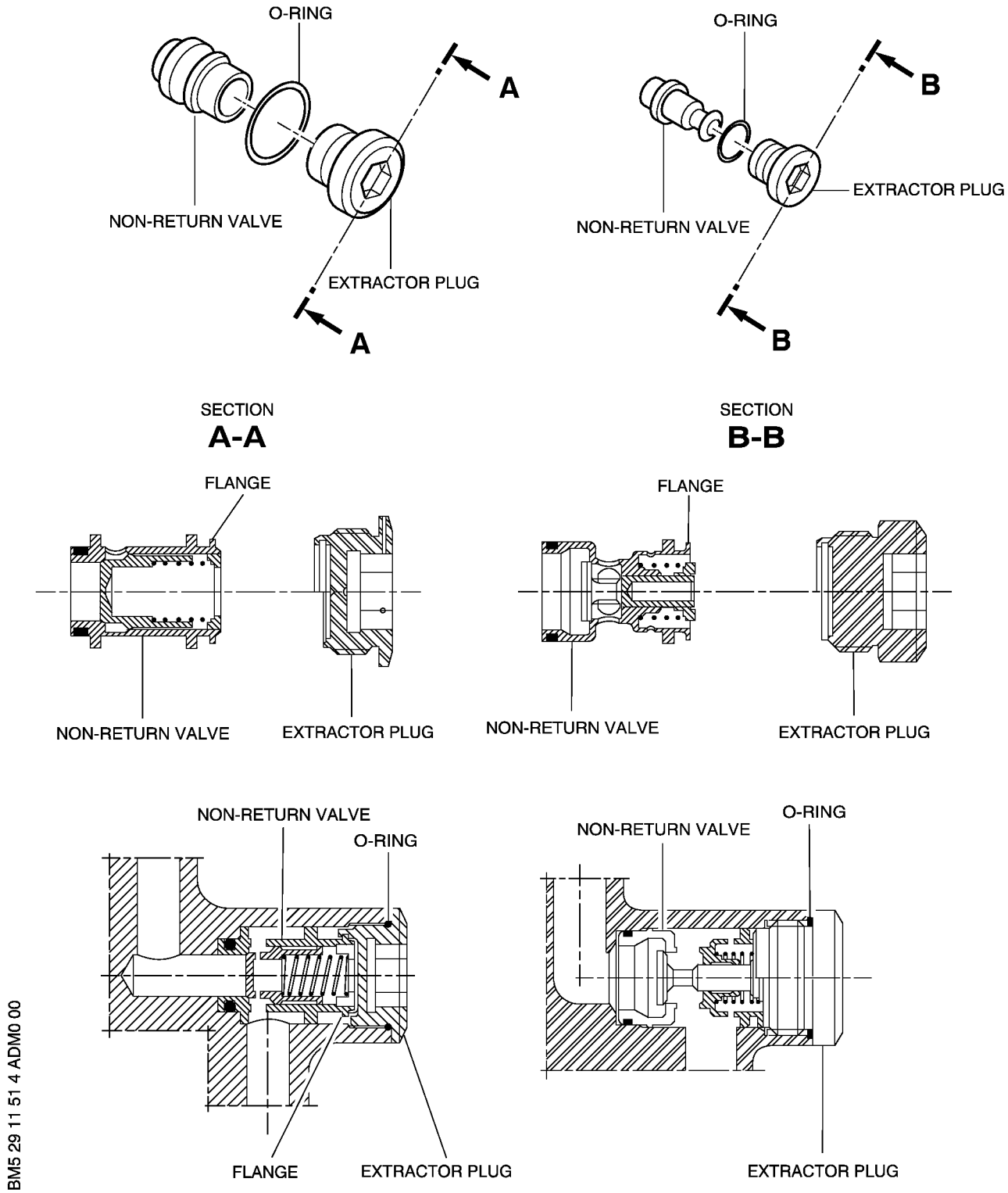
(6)Connect pipe (19) to union (17). Tighten pipe end-fitting (18).
TORQUE pipe end-fitting (18) to between 3.73 and 4.07 m.daN (330 and 360 lbf.in.).

(7)Connect pipe (22) to union (25). Tighten pipe end-fitting (23).
TORQUE pipe end-fitting (23) to between 4.86 and 5.31 m.daN

(430 and 470 lbf.in.).
(8)Connect pipe (34) to elbow union (32). Tighten pipe end-fitting (33). TORQUE pipe end-fitting (33) to between 7.5 and 8.3 m.daN (664 and 735 lbf.in.).

E. Tests
(1)Install selector valve 33XE (Ref. 24-24-52, P. Block 401).
(2)Remove safety clips and tags and close these circuit breakers : 1PE, 1GE, 2GE, 4GE and 7GX.
(3)Make certain that fluid level in Green hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(4)Pressurize Green hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(5)Bleed Green hydraulic system (Ref. 29-00-00, P. Block 401).
(6)Visually check for hydraulic fluid leakage at the various line connections.
(7)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

F. Close-up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Check fluid level in Green hydraulic reservoir, and top up as required (Ref. 12-12-29, P. Block 1).
(4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Remove warning notices.
(6)Remove access platform.
(7)Close access door 147AL to the Green ground connector.
(8)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Typical Non-Return Valve and Extractor Plug Installation
Figure 402

R

PUMPS DELIVERY RELIEF VALVE 291063 - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Container
B.	Circuit Breaker Safety Clips
C.	Warning Notices
D. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
E. 97A29102090000	Bobbin and Ring Installation Tod
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Reservoir Replenishing
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)On panel 427VU,
- place a warning notice prohibiting operation of the Green, Blue and Yellow systems.

(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B 8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL&/CARGO DOOR/PUMP	7GX	333/T51

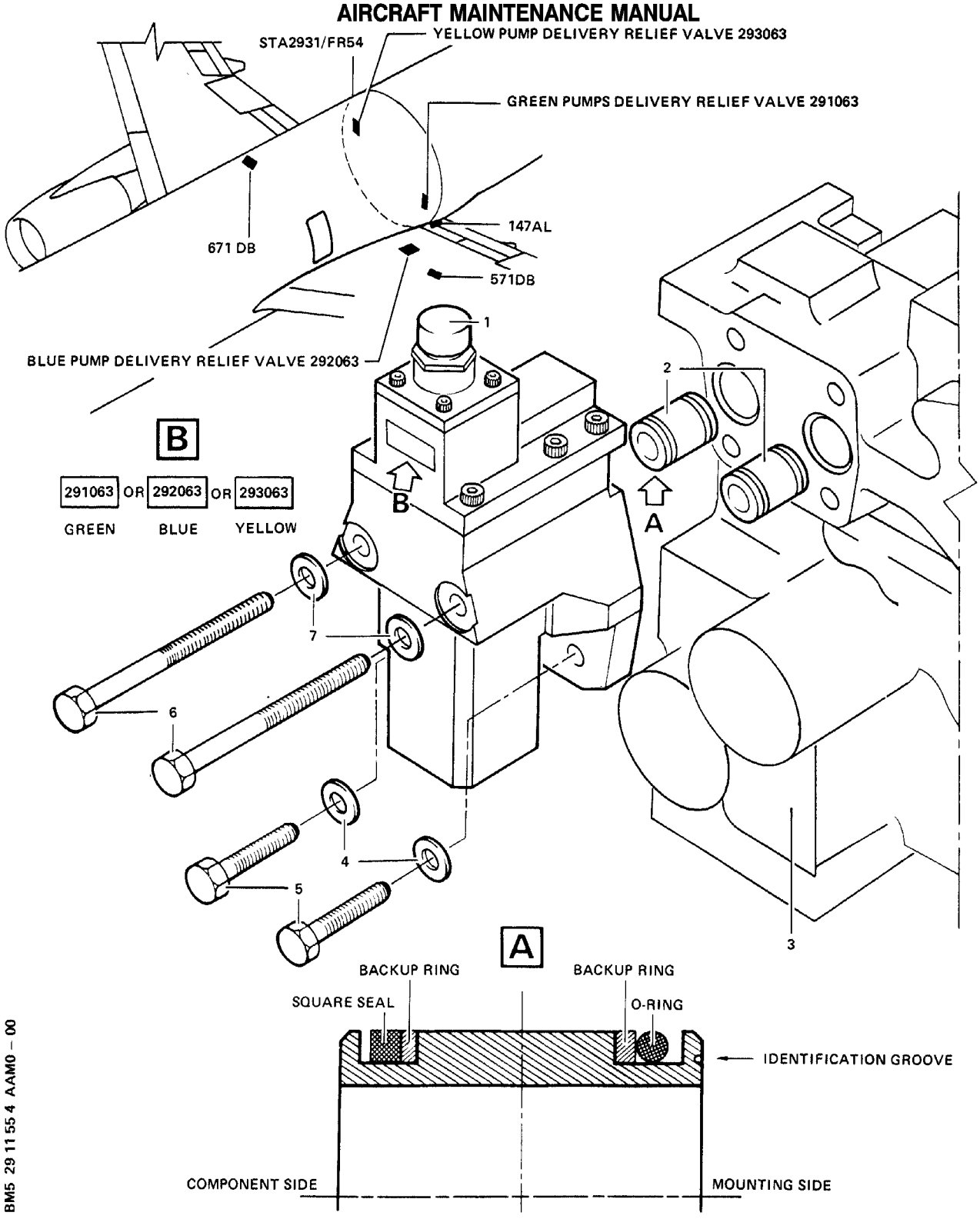
(3)Open access doors to Green (zone 147), Blue (zone 571) and Yellow (zone 671) hydraulic ground connectors.
(4)Place a warning notice on ground connectors prohibiting pressurization of Green, Blue and Yellow systems.
(5)Open main gear doors (Ref. 32-12-11, P. Block 301).
(6)Depressurize Green, Blue or Yellow reservoir, according to which valve is to be removed (Ref. 29-14-00, P. Block 301).
(7)Depressurize Green, Blue or Yellow system (Ref. 29-10-00, P. Block 301).
(8)Install container below valve to be removed.

B. Removal
(1)Cut and remove lockwire and remove the four screws (5-6) and the four washers (4-7).
(2)Remove valve (1) and the two bobbins (2).
CAUTION : WHEN REMOVING THE BOBBINS, GREAT CARE SHOULD BE TAKEN NOT TO DAMAGE THEM. IT IS RECOMMENDED TO USE SPECIAL TOOL 97A29102090000.

C. Preparation of Replacement Component
CAUTION : THE GROOVED END IS TO BE INSERTED IN THE MANIFOLD PORTS.
(1)Fit two bobbins (2) with new seals, lubricate with Mat. No.02-003.
(2)Engage two bobbins (2) into grooves of manifold (3) ports.

D. Installation
(1)Position replacement valve (1) on manifold (3).
(2)Install four washers (4-7) and four screws (5-6) (2 long and 2 short).
(3)Tighten and wirelock the four screws.

E. Tests
(1)Pressurize hydraulic reservoir associated with removed valve (Ref. 29-14-00, P. Block 301).
(2)Pressurize hydraulic system associated with removed valve (Ref. 29-10-00, P. Block 301).



Pumps Delivery Relief Valve
Figure 401

(3)Check for leakage of hydraulic fluid at valve and at manifold.
(4)Stop pressurization of hydraulic system. Press pushbutton on pumps delivery relief valve, and check quick depressurization both on accumulator pressure gage and aurally.

F. Close-Up
(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 1GL, 6GL, 7GX.
(2)Remove container
(3)Check fluid level in reservoir, and top up as required (Ref. 12-12-29, P. Block 301).
(4)Close landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Remove warning notices and close access doors to ground connectors.

PUMPS DELIVERY RELIEF VALVE (GREEN 291063, BLUE 292063, YELLOW 293063) - INSPECTION/CHECK

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Reason for the Job
To check valve for correct operation and leakage.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.60 (8 ft. 8 in.)
B.	Cart - Hydraulic Ground Power Supply
Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(3)Install access platform.
(4)Make certain that hydraulic system reservoirs are pressurized (Ref. 29-14-00, P. Block 301).
(5)Connect hydraulic ground power cart to Green, Blue or Yellow system depending on valve to be checked.
(6)Make certain that the following circuit breaker is closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD SEL	1CB	332/U63

(7)On SERVO CTL section of panel 428VU, make certain that B, G and Y pushbutton switches are pressed (in), OFF legends off.

B. Check for Correct Operation of Valves 291063 or 292063
(1)On SERVO CTL section of panel 428VU, release G (for 291063 check) or B (for 292063 check) pushbutton switch, (OFF legend on) to minimize internal leakage in checked system.
(2)Start up hydraulic ground power cart and increase pressure in system. Check that pumps delivery relief valve opens when pressure (read on

pressure gage) reaches :
P = 3400 + 50 - 0 psi (234.4 + 3.4 - 0 bars).
NOTE : Valve opening is shown by a rapid increase in flow.

(3)At hydraulic ground power cart, slowly reduce pressure. Check that pumps delivery relief valve closes when pressure P reaches 3200 psi (220.6 bars).
NOTE : Valve closing is shown by a rapid decrease in flow.

C. Check for Correct Operation of Valve 293063.

(1)On SERVO CTL section of panel 428VU, release Y pushbutton switch, (OFF legend on) to minimize internal leakage in Yellow system.
(2)Manually open valve 293067 and hold in this position.
(3)Start-up hydraulic ground power cart and slowly increase pressure. Flow increases as pressure rises. When there is a rapid increase in outflow, valve 293063 cracking pressure 3400 + 50 - 0 psi (234.4 + 3.4 - 0 bars) has been reached.
(4)Release valve 293067 on Yellow system manifold.
(5)At hydraulic ground power cart, slowly reduce pressure. Check that valve closes at 3200 psi (220.6 bars).
NOTE : Valve closing is shown by a rapid decrease in flow.

D. Check for Leakage

(1)Using hydraulic ground power cart, pressurize hydraulic system associated with valve to be checked (Pressure 3000 psi or 206 bars).
(2)Check valve for leakage either aurally or by feel (vibrations).
(3)Shut down hydraulic ground power cart.

E. Close-Up

(1)Disconnect hydraulic ground power cart.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove access platform.
(4)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Containers
B.	Circuit Breaker Safety Clips
C.	Warning Notices
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-14-29, P. Block 1	Nitrogen Charging of Hydraulic Accumulators
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

NOTE : Removal/Installation of Blue and Yellow accumulators 292070 and 293070 respectively is covered in this topic.

A. Job Set-Up
(1)On panel 427VU
- display a warning notice prohibiting operation of Green, Blue and Yellow systems.
(2)Open, safety and tag the following circuit breakers

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN/	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(3)Open access doors 147AL, 571DB and 671DB to hydraulic ground connectors.
(4)Display a warning notice on ground connectors prohibiting pressurization of Green, Blue and Yellow systems.
(5)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(6)Depressurize Green, Blue or Yellow reservoir, as appropriate.

(Ref. 29-14-00, P. Block 301).
(7)Depressurize Green, Blue or Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(8)Remove accumulator charging valve cap, and loosen locknut; release nitrogen pressure.
(a)For green accumulator : charging valve 1071 on charging manifold 1069.
(b)For Blue accumulator : charging valve 2071 on charging manifold 2069
(c)For Yellow accumulator : charging valve 3071 on charging manifold 3066.
(9)Place container under accumulator to be removed,

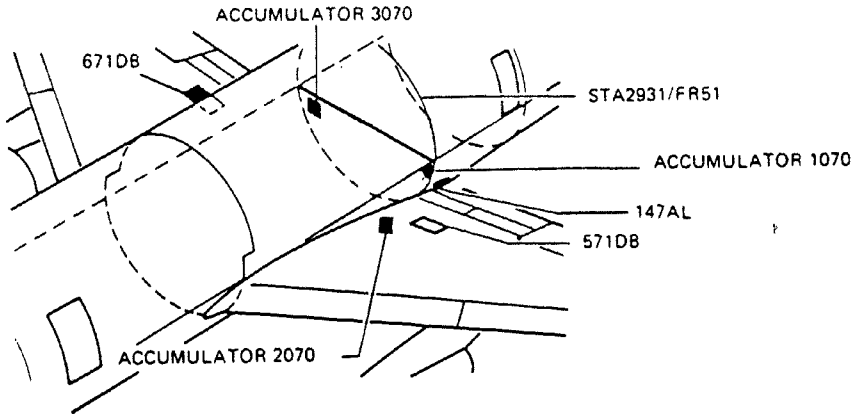
B. Removal
(Ref. Fig. 401)
(1)Disconnect line (6) from accumulator lower union.
(2)Disconnect line (3) from accumulator upper union.
(3)Unlock the three attaching latches.
(4)Remove retaining ring (1) and upper packing (2) from accumulator.
(5)Remove accumulator from its mounting.

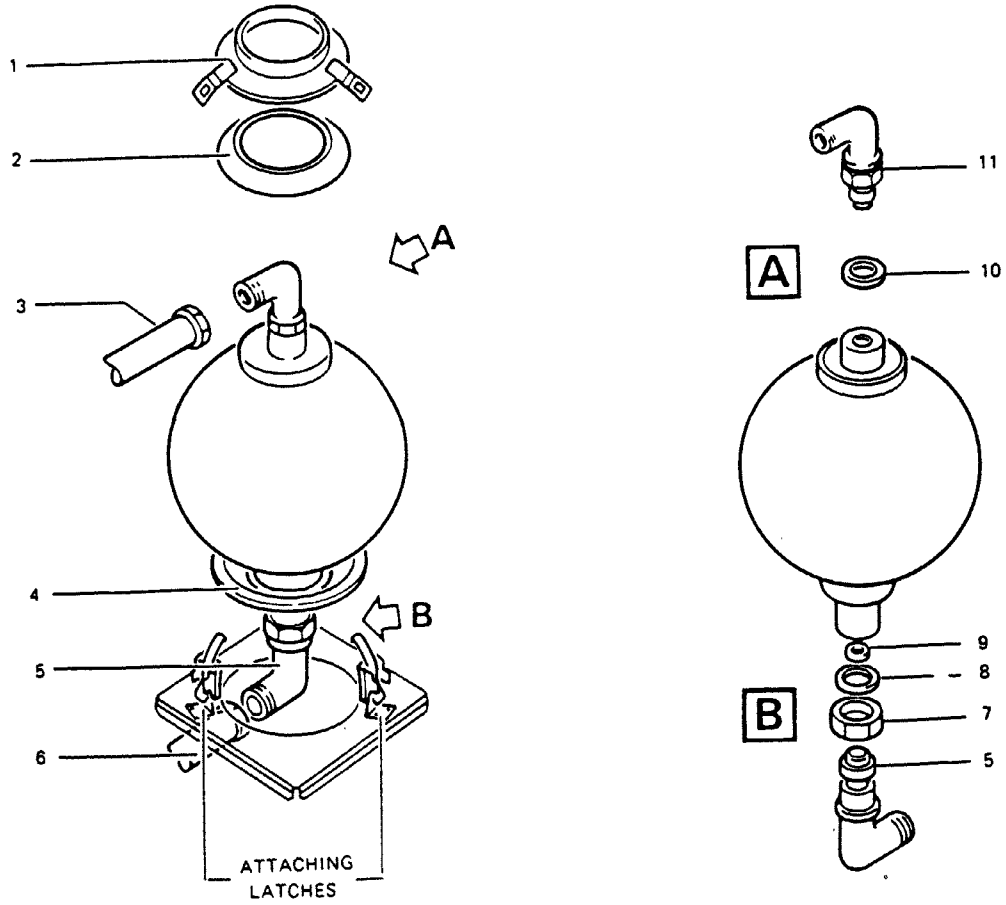
C. Preparation of Replacement Component
(1)Remove elbow union (11), remove and discard O-ring (10).
(2)Loosen locknut (7) on elbow union (5).
Remove elbow union (5), remove and discard packing (9) and back-up washer (8).
(3)Clean parts retained from removed accumulator and check for correct condition.
(4)Install elbow union (11) equipped with new o-ring (10) on replacement accumulator. Tighten elbow union.
(5)Install elbow union (5) equipped with new packing (9) and back-up washer (8) on replacement accumulator. Do not tighten locknut (7).

D. Installation
(1)Check lower packing (4) for correct condition and installation, then install accumulator on mounting.
(2)Install accumulator upper packing (2) and retaining ring (1).
(3)Temporarily connect line (3) without tightening at this stage.
(4)Correctly position lower union (5) and temporarily connect line (6) without tightening at this stage.
(5)Correctly position retaining ring (1). Lock the three attaching latches.
(6)Tighten lower union locknut (7) and the nuts on lines (3) and (6).

E. Tests
(1)Charge accumulator (Ref. 12-14-29, P. Block 1).
(2)Pressurize relevant hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(3)Pressurize relevant hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Check for hydraulic fluid and nitrogen leakage at accumulator unions.
(5)Check that direct reading pressure gage displays 3000 ± 100 psi (206 ± 7 bars).

F. Close-Up
(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE,





8M5 29 11 56 4 BCMO

Green (291070) - Blue (292070) Yellow (293070) Accumulators
Figure 401

1GL, 6GL and 7GX.
(2)Remove container.
(3)Check fluid level in relevant reservoir. Replenish as required (Ref. 12-12-29, P. Block 1).
(4)Close main landing gear door (Ref. 32-12-11, P. Block 301).
(5)Remove warning notices and close access doors to ground connectors.

MANIFOLD - HYDRAULIC GREEN (291700, 291701) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Circuit Breaker Safety Clips
C.	Container
D.	Warning Notices
E.	Access Platforms 4.5 m (14 ft)
F. 98A54003119200	SPECIAL WRENCH
G. 98A54003120200	SPECIAL WRENCH
H. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
I. Material No. 19-010	Corrosion - Resistant Steel Lockwire 0.8 mm (0.032 in.) (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-11-62, P. Block 401	Engine Pump Pressure Switch 113GK (112GK)
- 29-11-65, P. Block 401	Green Hydraulic Non return Valves (291040, 291041, 291042, 291043)
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

2. Procedure

A. Job set-up
(1)Open, safety and tag the following circuit breakers :
(a)For Engine 1 Green Pump :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57

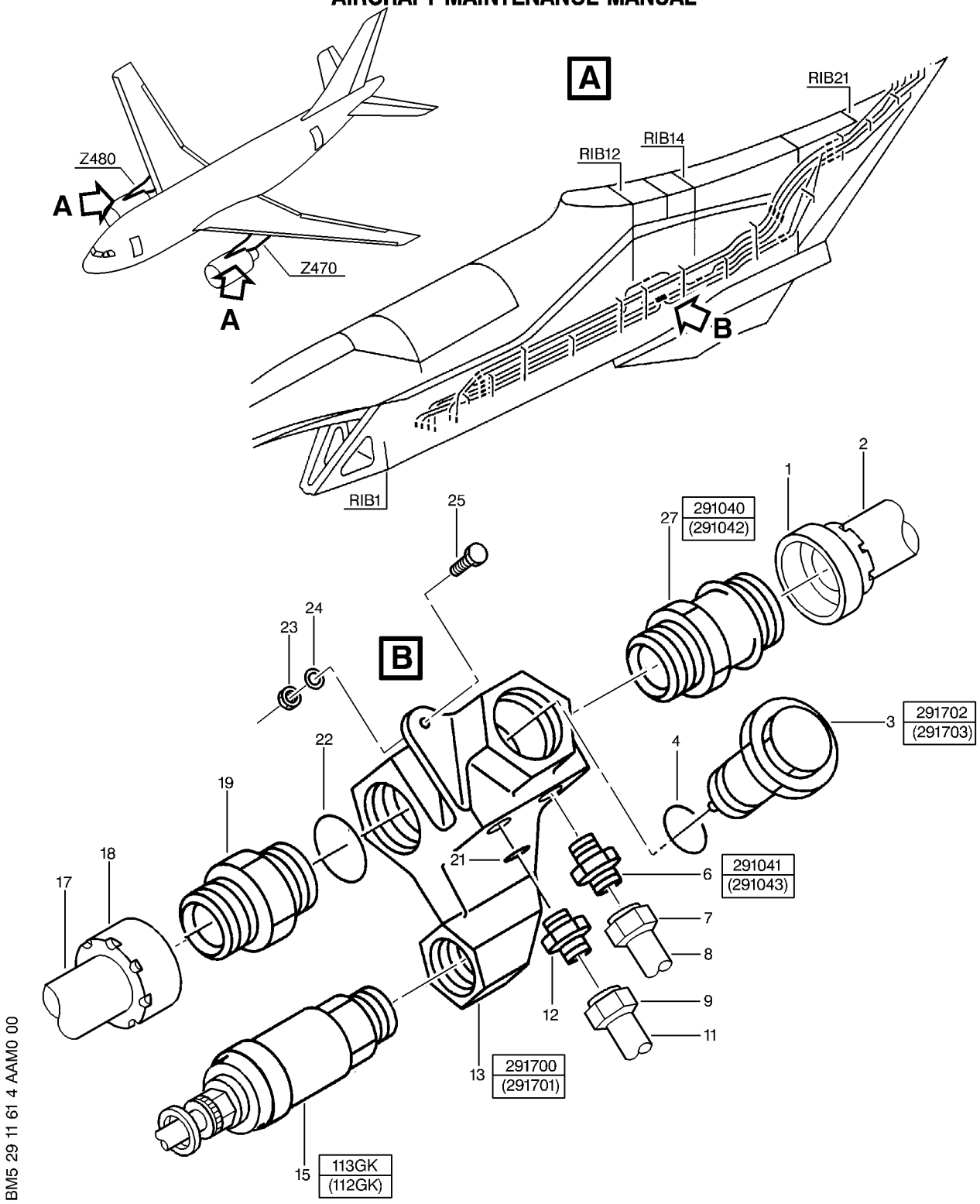
(b)For Engine 2 Green Pump :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58

(2)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(4)Display a warning notice on panel 427VU prohibiting pressurization and use of Green hydraulic system.
(5)Open access door 147 AL.
(6)Display a warning notice on ground connectors prohibiting pressurization and use of Green hydraulic system.
(7)Install access platform at zone 470 (480).
(8)Remove access panel 473AL (483AL).
(9)Place a container under the manifold.
(Ref. Fig. 401)

B. Removal
(1)Using special wrench 98A54003120200, loosen nut (1) and disconnect pressure tube (2) from non-return valve (27).
(2)Using special wrench 98A54003119200, loosen nut (18) and disconnect pressure tube (17) from union (19).
(3)Loosen nut (9) and disconnect case drain tube (11) from union (12).
(4)Loosen nut (7) and disconnect case drain tube (8) from non-return valve (6).
(5)Remove union (19) and discard packing (22).
(6)Remove union (12) and discard packing (21).
(7)Cut and remove lockwire from restrictor (3).
(8)Remove restrictor (3) and discard packing (4).
(9)Remove non-return valves (6) and (27) (Ref. 29-11-65, P. Block 401).
(10)Remove pressure switch (15) (Ref. 29-11-62, P. Block 401).
(11)Remove and discard nut (23).
(12)Remove washer (24), bolt (25) and remove the manifold (13).
(13)Install blanking plugs on disconnected line ends and manifold ports.

C. Installation
(1)Make sure that the parts retained from the removed component are clean and in correct condition.
(2)Remove blanking plugs from disconnected line ends and manifold ports.
(3)Install the manifold (13) with bolt (25) and washer (24).
(4)Install new nut (23) and tighten it.
(5)Install non-return valves (6) and (27) (Ref. 29-11-65, P. Block 401).
(6)Install pressure switch (15) (Ref. 29-11-62, P. Block 401).
(7)Lubricate new packings (4), (21) and (22) with hydraulic fluid (Material No. 02-003).



Green Hydraulic Manifold
Figure 401

(8)Install restrictor (3) equipped with packing (4) on manifold (13).
(9)TORQUE restrictor (3) to 12.9 m.daN (95.13 lbf.ft).
(10)Install lockwire (Material No. 19-010) on the restrictor (3).
(12)Install union (12) equipped with packing (21) on manifold (13).
(13)TORQUE union (12) to between 1.6 and 1.7 m.daN (141.6 and 150.4 lbf.in).
(14)Install union (19) equipped with packing (22) on manifold (13).
(15)TORQUE union (19) to between 11.6 and 11.8 m.daN (85.6 and 87.08 lbf.ft).
(16)Connect case drain tube (8) on non-return valve (6) with nut (7).
(17)Connect case drain tube (11) on union (12) with nut (9).
(18)TORQUE nuts (7) and (9) to between 1.6 and 1.7 m.daN (141.6 and 150.4 lbf.in).
(19)Using special wrench 98A54003120200, connect pressure tube (2) on non-return valve (27) with nut (1).
(20)Using special wrench 98A54003119200, connect pressure tube (17) on union (19) with nut (18).
(21)TORQUE nuts (1) and (18) to between 12.9 and 14.2 m.daN (95.2 and 104.79 lbf.ft).

R D. Test
(1)Remove safety clips and tags and close the following circuit breakers :
(a)For Engine 1 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 99GK and 101GK.
(b)For Engine 2 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 100GK and 103GK.
(2)Remove warning notices.
(3)Pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(4)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).
(5)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(6)Bleed Green hydraulic system (Ref. 29-00-00, P. Block 401).
(7)Visually check for hydraulic fluid leakage at the connections.

R E. Close-up
(1)Remove container.
(2)Make certain that working areas are clean and clear of tools and miscellaneous items of equipment.
(3)Install access panel 473AL (483AL).
(4)Close access door 147AL.
(5)Remove access platform.

ENGINE PUMP PRESSURE SWITCH 113GK (112GK) REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Blanking Plug
	(2)	Circuit Breaker Safety Clip
	(3)	Container
	(4)	Warning Notice
R	(5)	Access Platform 4.5 m (14 ft)
R	(6)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
R	(7)	Lockwire, Corrosion Resistant Steel, Dia. 06 mm (0.025 in.)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurization System
R	- 31-51-00, P. Block 201	Ecam System
	- 71-00-00, P. Block 501	Power Plant

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers associated with engine pump pressure switch to be removed.

(a)Engine pump pressure switch 113GK

PANEL	SERVICE	IDENT.	LOCATION
	Engine 1 Green Pump		
101VU	HYD/PUMP	1GE	GEN2/B8
101VU	HYD/PUMP	2GE	GEN2/B8
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57

(b)Engine pump pressure switch 112GK

PANEL	SERVICE	IDENT.	LOCATION
	Engine 2 Green Pump		
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B8
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58

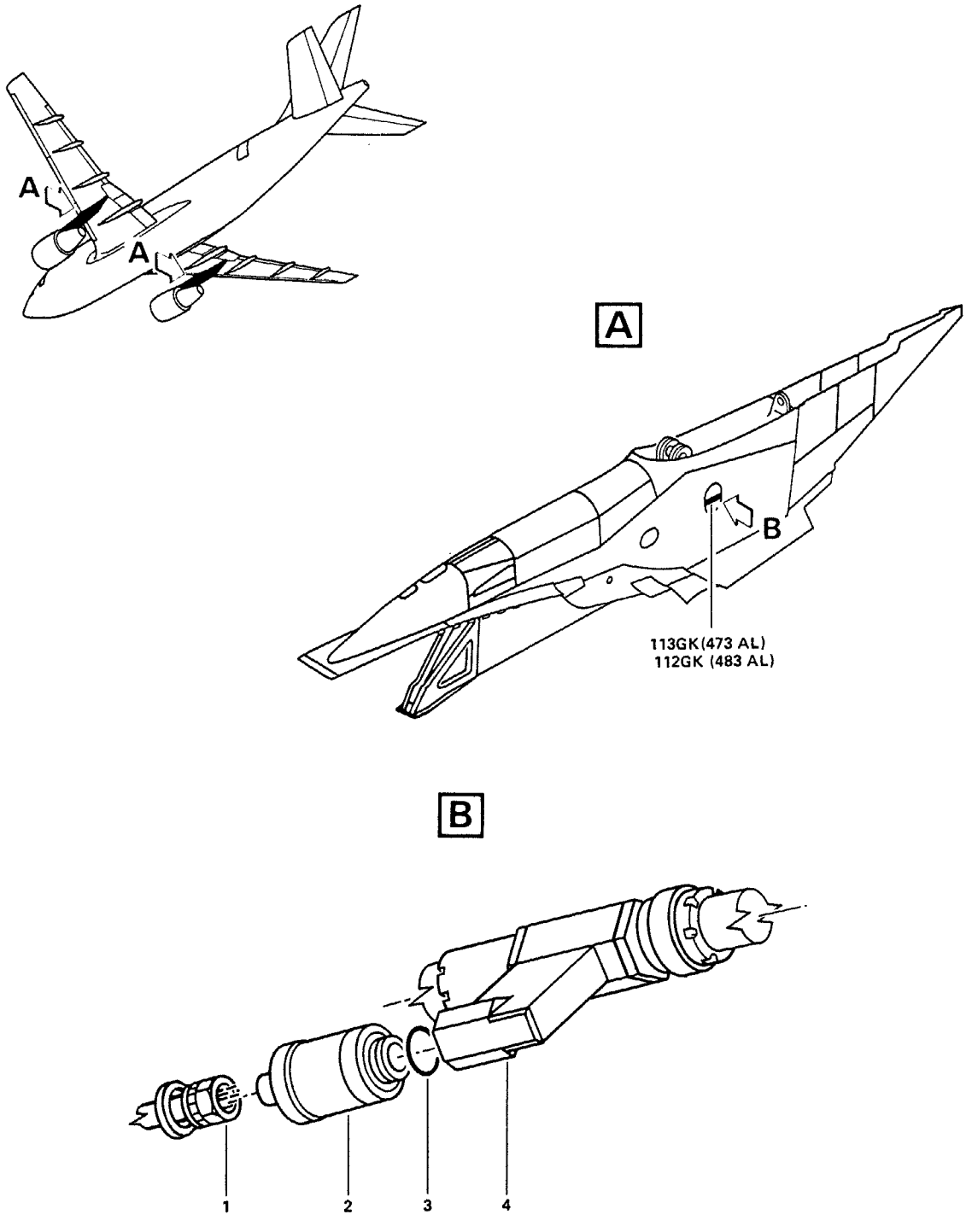
R (2)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
R (3)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
R (4)Display a warning notice on panel 427VU prohibiting pressurization and use of Green hydraulic system.
R (5)Open access door 147AL.
R (6)Display a warning notice on ground connectors prohibiting pressurization and use of Green hydraulic system.
R (7)Install access platform at zone 470 (480).
R (8)Remove access panel 473AL (483AL).
R (9)Place a container under the engine pump pressure switch.

B. Removal
(Ref. Fig. 401)
(1)Cut and remove lockwire and disconnect electrical connector (1).
(2)Remove pressure switch (2), discard packing (3).
(3)Plug/cap engine pump pressure switch and manifold.

C. Preparation of Replacement Component
(1)Lubricate packing (3) with hydraulic fluid, Mat. No. 02-003.

D. Installation
(1)Install pressure switch (2) equipped with packing (3) on manifold (4). TORQUE pressure switch (2) to between 30.2 and 38.3 lbf. (4.1 and 5.2 m.daN.).
(2)Connect and wirelock electrical connector (1).

E. Test
(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 5GD then 99GK, 101GK or 100GK, 103GK.
R (2)Remove warning notices.
R (3)Pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
R (4)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
R (5)Do the ECAM start procedure (Ref. 31-51-00, P. Block 201).
R (6)On ECAM control panel, press HYD pushbutton switch and on panel 427VU, make certain that corresponding ENG PUMP pushbutton switch is pressed (in).
R (7)Dry-motor the engine (Ref. 71-00-00, P. Block 501).
R (8)Check pressure switch union for leakage.
R (9)On panel 427VU, check that LO PR legend goes off as soon as pressure is



BM5 29 11 62 4 BCM0 – 19

Pressure Switch
Figure 401

higher than 2200 psi (152 bars).

R (10)Stop dry-motoring engine.

R (11)On panel 427VU, check that LO PR legend comes on as soon as pressure is lower than 1800 psi (124 bars).

R (12)Check level of hydraulic fluid in reservoir and top-up if required (Ref. 12-12-29, P. Block 1).

F. Close-Up

R (1)Do the ECAM stop procedure (Ref. 31-51-00, P. Block 201).

R (2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R (3)Remove container.

R (4)Make certain that working areas are clean and clear of tools and miscellaneous items of equipement.

R (5)Install access panel 473AL (483AL).

R (6)Close access door 147AL.

R (7)Remove access platform.

GROUND CONNECTOR - SELF SEALING, G
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. G Suction Self-Sealing Ground Connector

A. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

B. Procedure

(1)Job set-up.

(a)On overhead panel 427VU in the flight compartment :

1 Make certain that the Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).

2 Make sure that the PTU G/Y and G/B pushbutton switches are released (ON legends off).

3 Display a warning notice prohibiting pressurization and use of the Green hydraulic system.

(b)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	RSVR QTY/IND	1GQ	333/T59

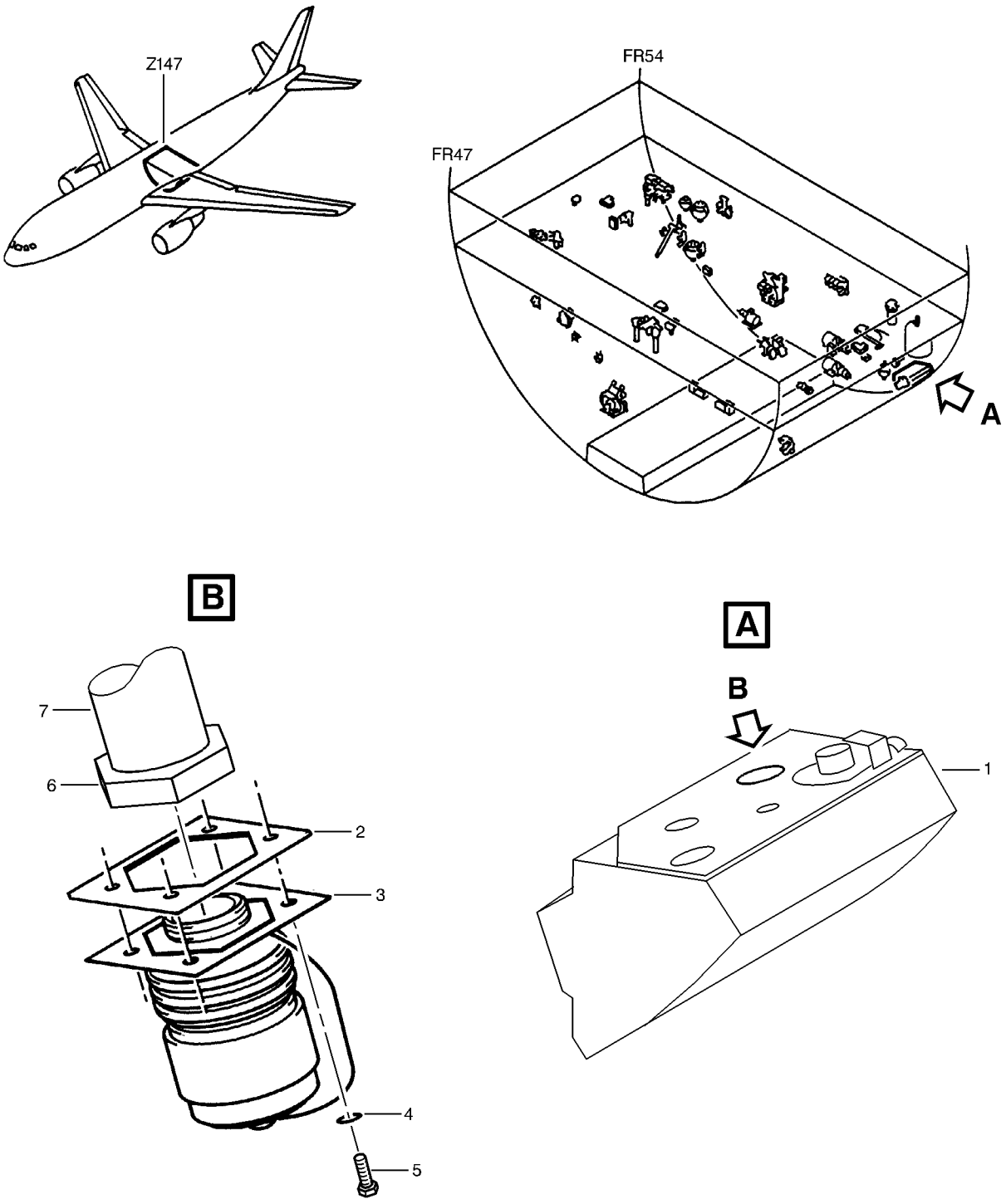
PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Open the main landing gear doors (Ref. 32-12-11, P. Block 301).
(e)Install an access platform at zone 147.
(f)Depressurize the Green hydraulic system (Ref. 29-10-00, P. Block 301).
(g)Depressurize the Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(h)Install a container and absorbent material under the Green hydraulic reservoir and around the ground connector.
(j)Drain Green hydraulic reservoir (Ref. 29-00-00, P. Block 301).

(2)Removal.
(Ref. Fig. 401)
(a)Loosen the pipe end fitting (6) and disconnect the pipe (7) from the Green suction ground connector (3).
(b)Hold the connector (3) and remove the bolts (5) and washers (4).
(c)Remove the connector (3) from the Green ground service panel (1).
(d)Remove and discard the packing (2) from the connector (3).
(e)Install blanking plugs on the disconnected line ends and connector port.

(3)Installation.
(Ref. Fig. 401)
(a)Examine the structure of aircraft in the connector attachment area for cracks, corrosion or other damage.
(b)Remove the blanking plugs from the disconnected line ends and connector port.
(c)Apply HYDRAULIC FLUIDS (Material No. 02-003) to threads of connector (3).
(d)Install a new packing (2) on the connector (3).
(e)Put and hold the connector (3) in position on the Green ground service panel (1).
(f)Install the bolts (5) and washers (4) and TORQUE the bolts (5) to between 0.83 and 0.94 m.daN (73.45 and 83.18 lbf.in.).
(g)Connect the pipe (7) to the connector (3) and TORQUE the pipe end fitting (6) to between 9.7 and 10.7 m.daN (71.53 and 78.90 lbf.ft).

(4)Tests.
(a)Remove safety clips and tags and close these circuit breakers : 1CB, 2CB, 1GQ, 1GR, 1GL, 6GL and 4GE.
(b)Make certain that the fluid level in the Green hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(c)Pressurize the Green hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(d)Bleed the Green hydraulic system (Ref. 29-00-00, P. Block 401).
(e)Visually check for hydraulic fluid leakage at the various line



G Suction Self-Sealing Ground Connector
Figure 401

connections.
(f)Check for air leakage, using soapy water and direct reading pressure gage.
(g)Check that the quantity transmitter direct reading gage and the quantity indicator in the flight compartment give the same indication.
(h)Pressurize the Green hydraulic system (Ref. 29-10-00, P. Block 301).
(j)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).
(5)Close-up.
(a)Remove the container and absorbent material.
(b)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(c)Remove the warning notices.
(d)Remove the access platform.
(e)Close the main landing gear doors (Ref. 32-12-11, P. Block 301).
(f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. G Delivery Self-Sealing Ground Connector

A. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 24-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (FLAPS)
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 29-22-11, P. Block 401	Green/Blue Power Transfer Unit
- 29-23-11, P. Block 401	Green/Yellow Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

B. Procedure
(1)Job set-up.
(a)On overhead panel 427VU in the flight compartment :
1 Make certain that the Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).

2 Make sure that the PTU G/Y and G/B pushbutton switches are released (ON legends off).
3 Display a warning notice prohibiting pressurization and use of the Green hydraulic system.

(b)Open, safety and tag the following circuit breakers :

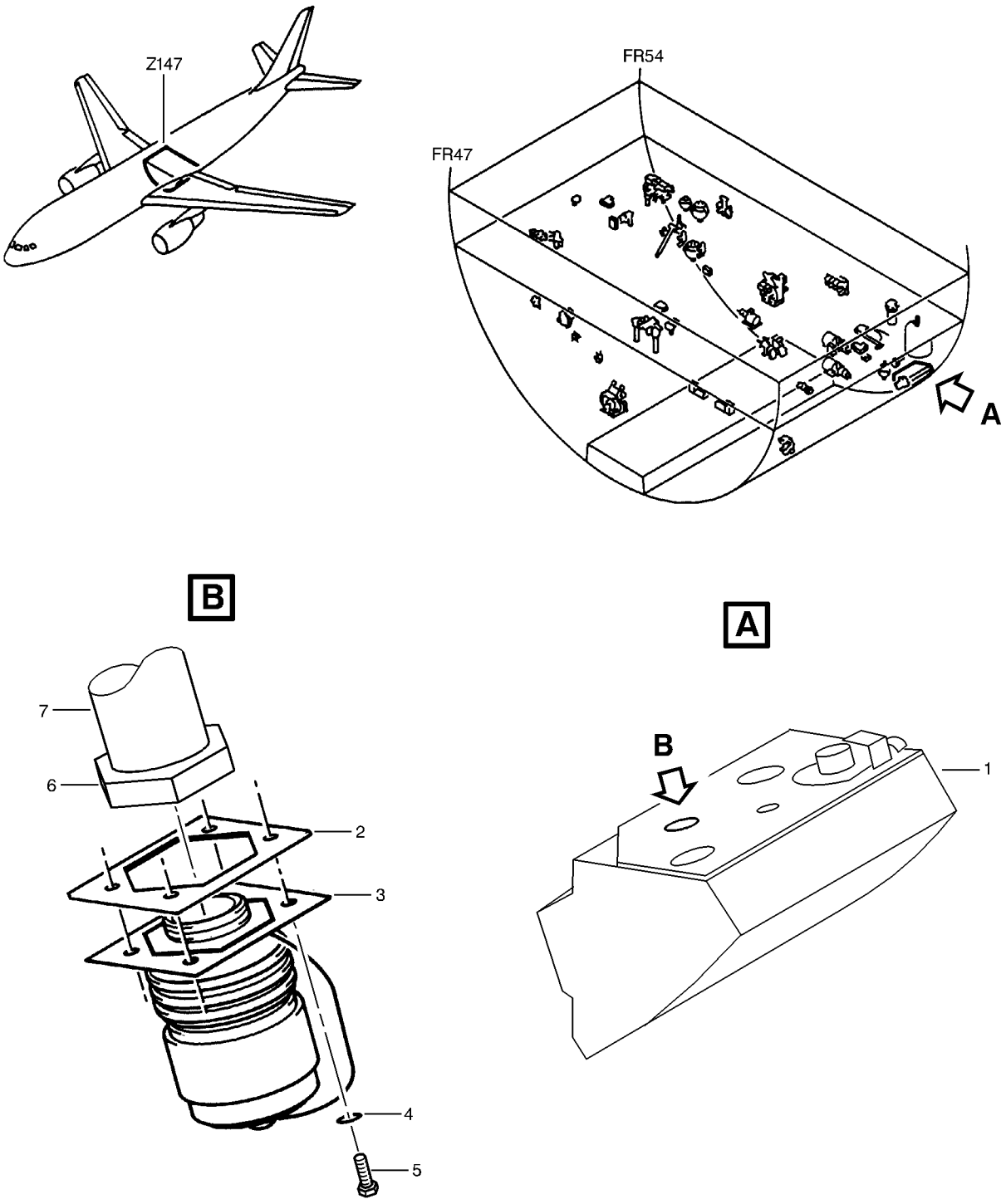
PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Open the main landing gear doors (Ref. 32-12-11, P. Block 301).
(e)Install an access platform at zone 147.
(f)Depressurize the Green hydraulic system (Ref. 29-10-00, P. Block 301).
(g)Depressurize the Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(h)Install a container and absorbent material under the Green hydraulic reservoir and around the ground connector.
(j)Drain the Green hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(k)Disconnect the isolation coupling from Power Transfer Unit (PTU) (Ref. 29-22-11, P. Block 401 and Ref. 29-23-11, P. Block 401).

(2)Removal.
(Ref. Fig. 402)
(a)Loosen the pipe end fitting (6) and disconnect the pipe (7) from the Green delivery ground connector (3).
(b)Hold the connector (3) and remove the bolts (5) and washers (4).
(c)Remove the connector (3) from the Green ground service panel (1).
(d)Remove and discard the packing (2) from the connector (3).
(e)Install blanking plugs on the disconnected line ends and connector port.

(3)Installation.
(a)Examine the structure of aircraft in the connector attachment area for cracks, corrosion or other damage.
(b)Remove the blanking plugs from the disconnected line ends and connector port.
(c)Apply HYDRAULIC FLUIDS (Material No. 02-003) to the threads of the connector (3).
(d)Install a new packing (2) on the connector (3).
(e)Put and hold the connector (3) in position on the Green ground service panel (1).
(f)Install the bolts (5) and washers (4) and TORQUE the bolts (5) to between 0.83 and 0.94 m.daN (73.45 and 83.18 lbf.in.).
(g)Connect the pipe (7) to the connector (3) and TORQUE the pipe end fitting (6) to between 9.7 and 10.7 m.daN (71.53 and 78.90 lbf.ft).

(4)Tests.



G Delivery Self-Sealing Ground Connector
Figure 402

(a)Remove the safety clips and tags and close these circuit breakers : 1CB, 2CB, 1GQ, 1GR, 1GL, 6GL and 4GE.
(b)Make certain that the fluid level in the Green hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(c)Pressurize the Green hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(d)Bleed the Green hydraulic system (Ref. 29-00-00, P. Block 401).
(e)Visually check for hydraulic fluid leakage at the various line connections.
(f)Check for air leakage, using soapy water and direct reading pressure gage.
(g)Make certain that the quantity transmitter direct reading gage and the quantity indicator in the flight compartment give the same indication.
(h)Pressurize the Green hydraulic system (Ref. 29-10-00, P. Block 301).
(j)Carry out an operational test of the hydraulic actuation and power transmission (flaps) (Ref. 27-54-00, P. Block 501).
(k)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).

(5)Close-up.
(a)Remove the container and absorbent material.
(b)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(c)Remove the warning notices.
(d)Remove the access platform.
(e)Close the main landing gear doors (Ref. 32-12-11, P. Block 301).
(f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. G Filling Self-Sealing Ground Connector

A. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

B. Procedure

(1)Job set-up.

(a)Select the following aircraft configuration, in the flight compartment:

1 Make sure that the speedbrakes and spoilers are retracted.

2 Make sure that the landing gears are extended and doors are closed.

3 Make sure that the forward and after cargo compartment doors 811 and 812 are closed.

4 On overhead panel 427VU, make certain that the Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).

5 Display a warning notice prohibiting pressurization and use of Green hydraulic system.

(b)On the Green ground service panel, make certain that the reservoir filling manual selector is in the neutral position.

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(d)Open the main landing gear doors (Ref. 32-12-11, P. Block 301).

(e)Install an access platform at zone 147.

(f)Depressurize the Green, Blue and Yellow hydraulic system (Ref. 29-10-00, P. Block 301).

(g)Depressurize the Green, Blue and Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(h)Install a container and absorbent material under the ground connector.

(2)Removal.

(Ref. Fig. 403)

(a)Loosen the pipe end fitting (5) and disconnect the pipe (6) from the Green filling ground connector (2).

(b)Hold the connector (2) and remove the bolts (4) and washers (3).

(c)Remove the connector (2) from the Green ground service panel (1).

(d)Install blanking plugs on the disconnected line ends and connector port.

(3)Installation.

(a)Examine the structure of aircraft in the connector attachment area for cracks, corrosion or other damage.

(b)Remove blanking plugs from the disconnected line ends and connector port.

(c)Apply HYDRAULIC FLUIDS (Material No. 02-003) to threads of the connector (2).

(d)Put and hold the connector (2) in position on Green ground service panel (1).

(e)Install the bolts (4) and washers (3) and TORQUE the bolts (4) to between 0.83 and 0.94 m.daN (73.45 and 83.18 lbf.in.).

(f)Connect the pipe (6) to the connector (2) and TORQUE the pipe end fitting (5) to between 9.7 and 10.7 m.daN (71.53 and 78.90 lbf.ft).

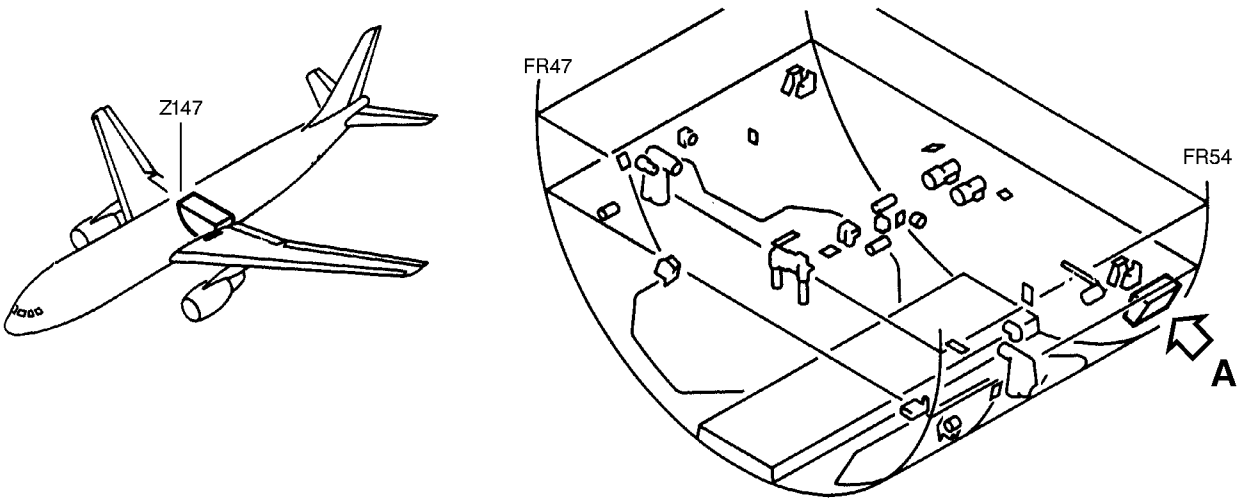
(4)Tests.

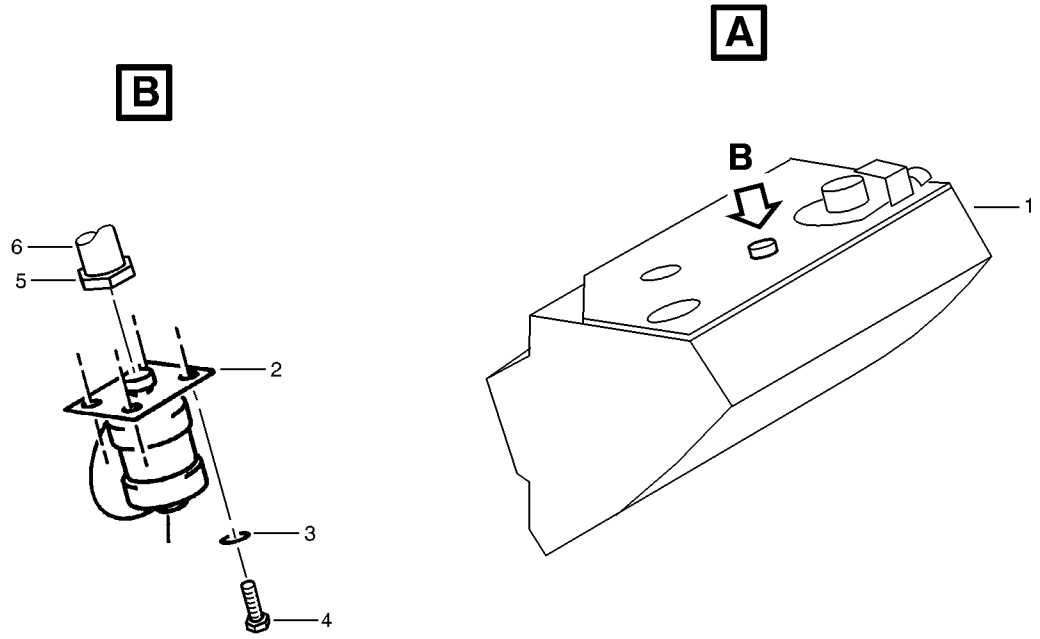
(a)Make certain that the fluid level in the Green hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).

(b)Pressurize the Green, Blue and Yellow hydraulic system reservoir (Ref. 29-14-00, P. Block 301).

(c)Bleed the Green, Blue and Yellow hydraulic system (Ref. 29-00-00, P. Block 401).

(d)Visually check for hydraulic fluid leakage at the various line





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G Filling Self-Sealing Ground Connector
Figure 403

connections.
(e)Check for air leakage, using soapy water and direct reading pressure gage.
(f)Check that the quantity transmitter direct reading gage and the quantity indicator in the flight compartment give the same indication.
(g)Pressurize the Green, Blue and Yellow hydraulic system (Ref. 29-10-00, P. Block 301).

(5)Close-up.
(a)Remove the container and absorbent material.
(b)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(c)Remove the warning notices.
(d)Remove the access platform.
(e)Close the main landing gear doors (Ref. 32-12-11, P. Block 301).
(f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

NON RETURN VALVE - GREEN HYDRAULIC (291040, 291041, 291042, 291043)-REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Circuit Breaker Safety Clips
C.	Container
D.	Warning Notices
E.	Access Platforms 4.5 m (14 ft)
F. 98A54003120200	SPECIAL WRENCH
G. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-11-62, P. Block 401	Engine Pump Pressure Switch 113GK (112GK)
- 29-11-65, P. Block 401	Green Hydraulic Non return Valves (291040, 291041, 291042, 291043)
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

2. Procedure

A. Job set-up

(1)Open, safety and tag the following circuit breakers :

(a)For Engine 1 Green Pump :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57

(b)For Engine 2 Green Pump :

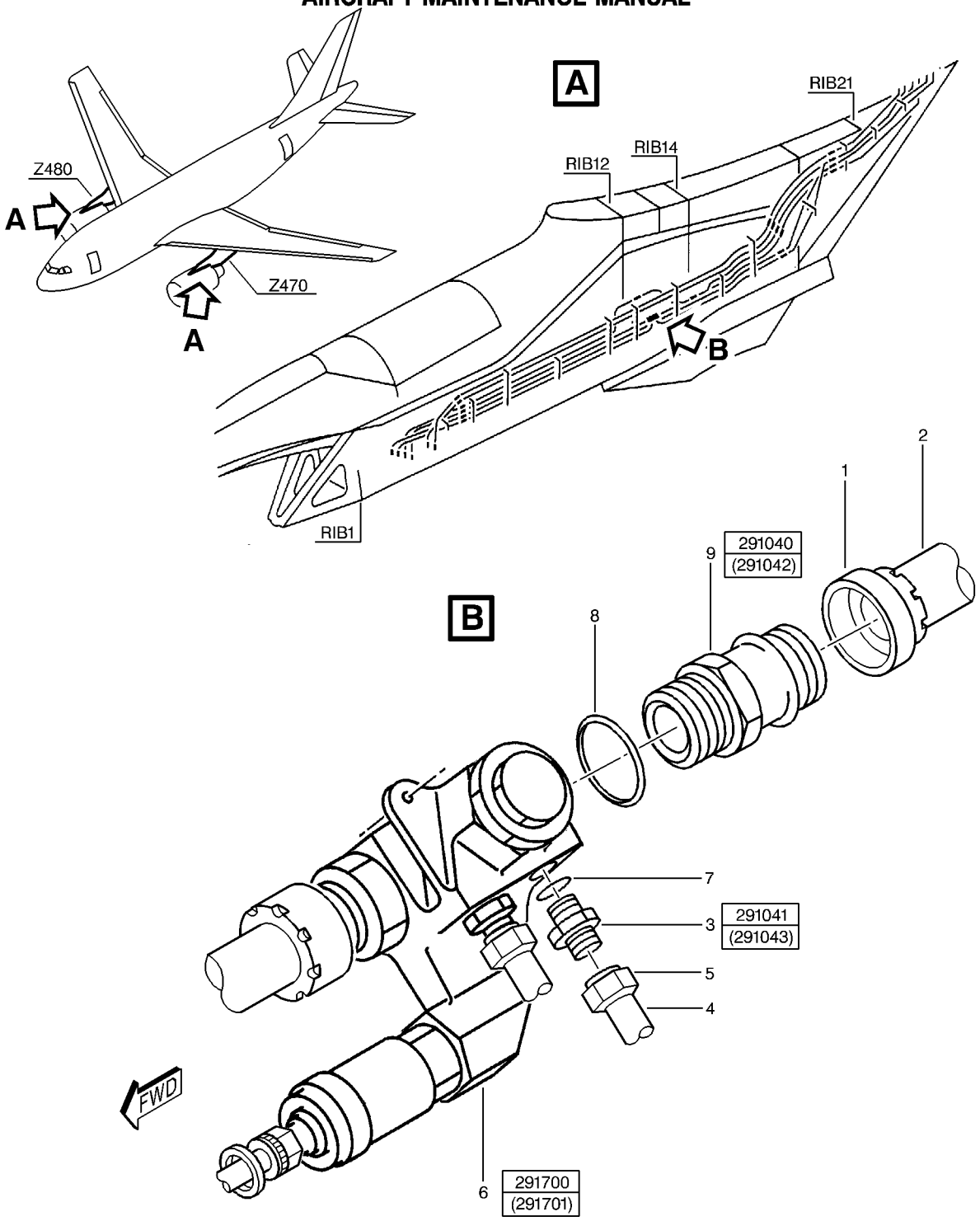
PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58

(2)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(4)Display a warning notice on panel 427VU prohibiting pressurization and use of Green hydraulic system.
(5)Open access door 147AL.
(6)Display a warning notice on ground connectors prohibiting pressurization and use of Green hydraulic system.
(7)Install access platform at zone 470 (480).
(8)Remove access panel 473AL (483AL).
(9)Place a container under the manifold.
(Ref. Fig. 401)

B. Removal
(1)Using special wrench 98A54003120200, loosen nut (1) and disconnect pressure tube (2) from non-return valve (9).
(2)Remove non-return valve (9) from manifold (6) and discard packing (8).
(3)Loosen nut (5) and disconnect case drain tube (4) from non-return valve (3).
(4)Remove non-return valve (3) from manifold (6) and discard packing (7).
(5)Install blanking plugs on disconnected line ends and manifold ports.

C. Installation
(1)Make sure that the parts retained from the removed component are clean and in correct condition.
(2)Remove blanking plugs from disconnected line ends and manifold ports.
(3)Lubricate new packings (7) and (8) with hydraulic fluid (Material No. 02-003).
(4)Install non-return valve (3) equipped with packing (7) on manifold (6).
(5)TORQUE non-return valve (3) to between 1.6 and 1.7 m.daN (141.6 and 150.4 lbf.in).
(6)Install non-return valve (9) equipped with packing (8) on manifold (6).
(7)TORQUE non-return valve (9) to between 11.6 and 11.8 m.daN (85.6 and 87.08 lbf.ft).
(8)Connect case drain tube (4) on non-return valve (3) with nut (5).
(9)TORQUE nut (5) to between 1.6 and 1.7 m.daN (141.6 and 150.4 lbf.in).
(10)Using special wrench 98A54003120200, connect pressure tube (2) on non-return valve (9) with nut (1).
(11)TORQUE nut (1) to between 12.9 and 14.2 m.daN (95.2 and 104.79 lbf.ft).

R D. Test
(1)Remove safety clips and tags and close the following circuit breakers :



Green Hydraulic Non-Return Valves
Figure 401

(a)For Engine 1 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 99GK and 101GK.

(b)For Engine 2 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 100GK and 103GK.

(2)Remove warning notices.
(3)Pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(4)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).
(5)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(6)Bleed Green hydraulic system (Ref. 29-00-00, P. Block 401).
(7)Visually check for hydraulic fluid leakage at the connections.

R E. Close-up
(1)Remove container.
(2)Make certain that working areas are clean and clear of tools and miscellaneous items of equipment.
(3)Install access panel 473AL (483AL).
(4)Close access door 147AL.
(5)Remove access platforms.

SELF - SEALING COUPLING HALF 291038 (291039) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Circuit Breaker Safety Clips
C.	Container
D.	Warning Notices
E.	Access Platform 4.5 m (14 ft)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job set-up
(1)Open, safety and tag the following circuit breakers :

(a)For Engine 1 Green Pump :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57

(b)For Engine 2 Green Pump :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58

(2)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(4)Display a warning notice on panel 427VU prohibiting pressurization and use of Green hydraulic system.
(5)Open access door 147 AL.
(6)Display a warning notice on ground connectors prohibiting pressurization and use of Green hydraulic system.
(7)Open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(8)Install access platform at zone 410(420).
(9)Place a container under the self-sealing coupling.

**ON A/C 101-200,

(Ref. Fig. 401)

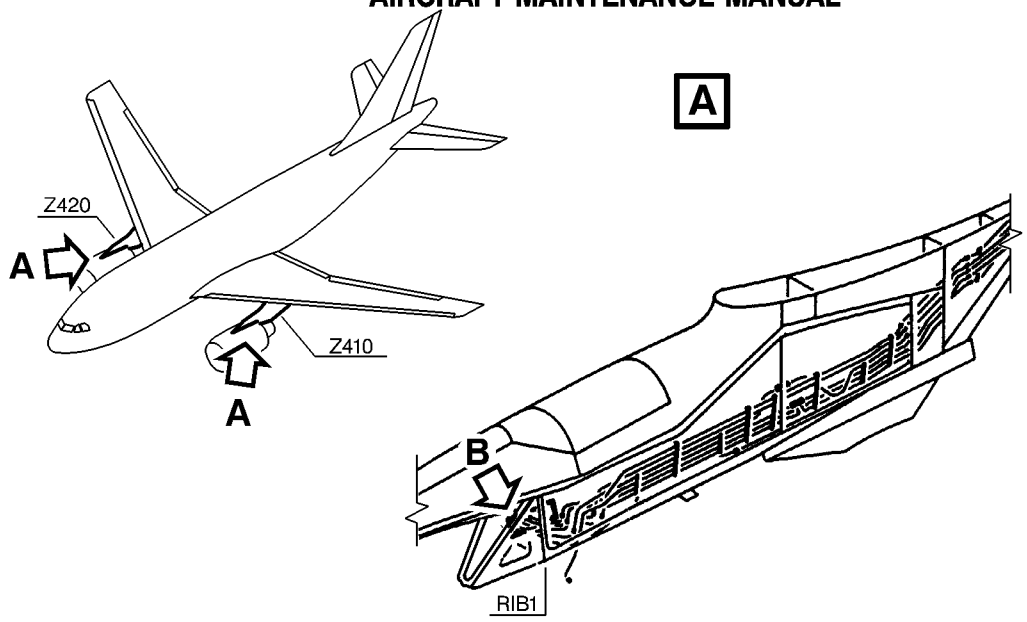
**ON A/C 001-100,

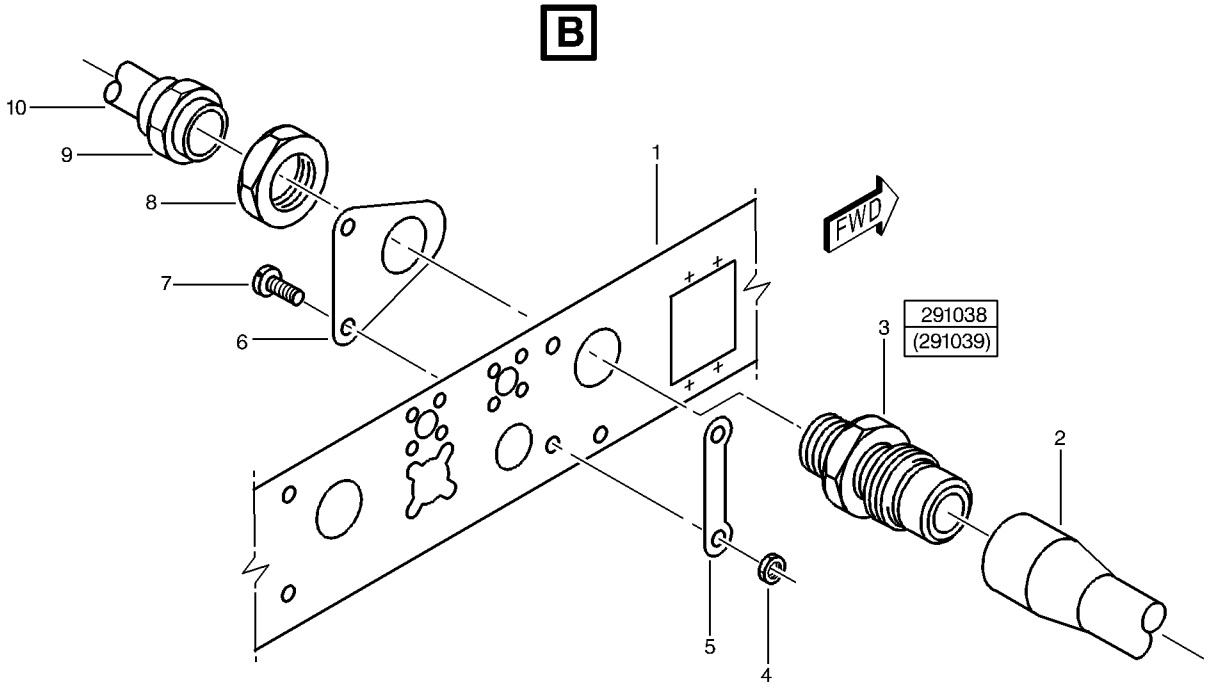
(Ref. Fig. 402)

**ON A/C ALL

B. Removal
(1)Disconnect suction tube (2) from self-sealing coupling half (3).
(2)Loosen nut (9) and disconnect suction tube (10) from self-sealing coupling half (3).
(3)Remove and discard nuts (4).
(4)Remove plate (5) and screws (7).
(5)Remove nut (8) and shim (6).
(6)Remove self-sealing coupling half (3) from hydraulic plate (1).
(7)Install blanking plugs on disconnected line ends.

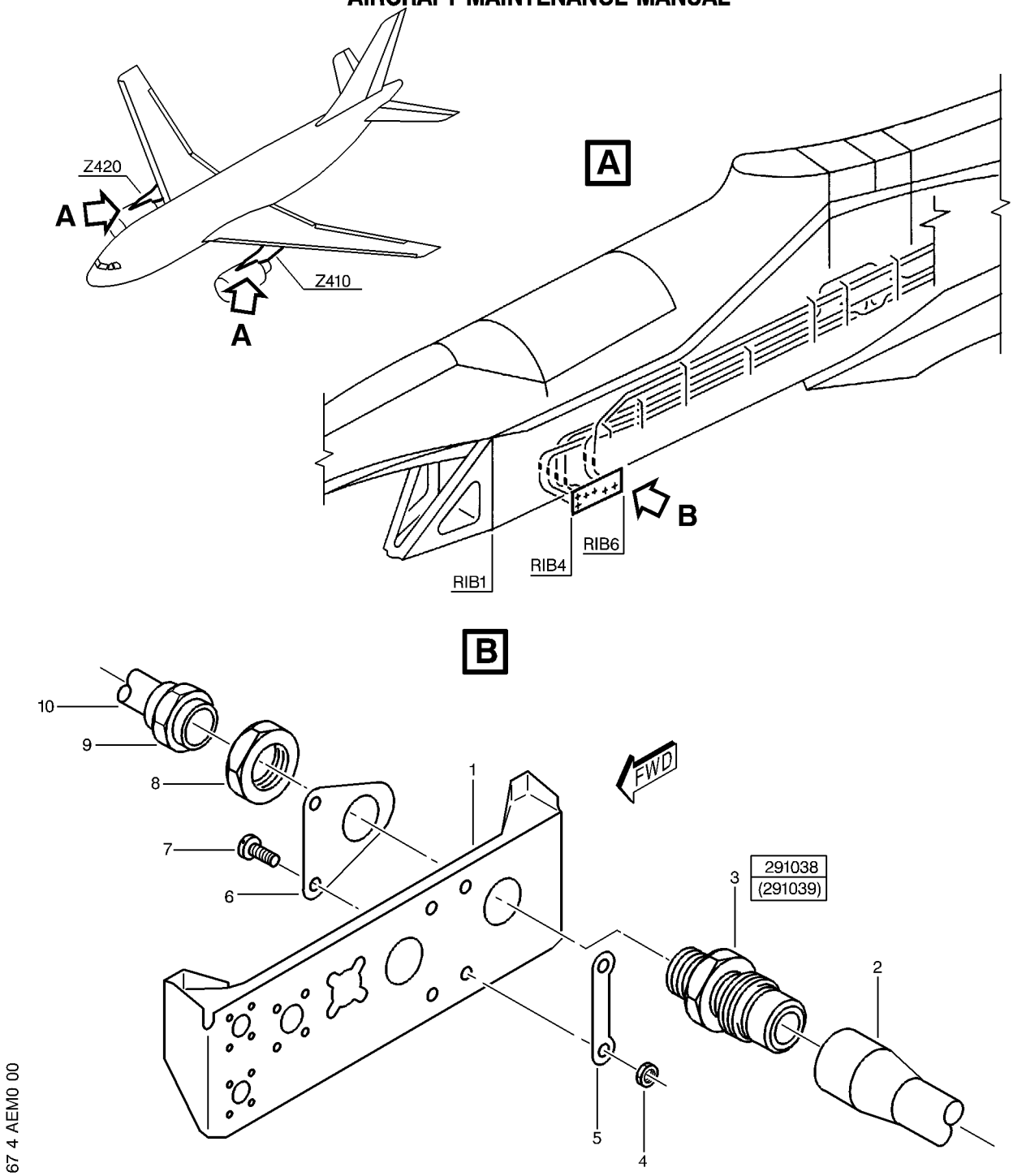
C. Installation
(1)Make sure that the parts retained from the removed component are clean and in correct condition.
(2)Remove blanking plugs from disconnected line ends.
(3)Install self-sealing coupling half (3) equipped with shim (6) and nut (8) on hydraulic plate (1).
(4)Install screws (7), plate (5) and new nuts (4) on hydraulic plate (1).
(5)TORQUE nut (8) to 12.9 m.daN (95.2 lbf.ft).
(6)Tighten nuts (4).
(7)Connect suction tube (10) on self-sealing coupling half (3) with nut (9).
(8)TORQUE nut (9) to between 21.5 and 23.7 m.daN (158.67 and 149.9 lbf.ft).
(9)Connect suction tube (2) on self-sealing coupling half (3).





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Self-Sealing Coupling Half
Figure 401



Self-Sealing Coupling Half
Figure 402

R D. Test
(1)Remove safety clips and tags and close the following circuit breakers :
(a)For Engine 1 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 99GK and 101GK.
(b)For Engine 2 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 100GK and 103GK.
(2)Remove warning notices.
(3)Pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(4)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).
(5)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(6)Bleed Green hydraulic system (Ref. 29-00-00, P. Block 401).
(7)Visually check for hydraulic fluid leakage at the connections.

R E. Close-up
(1)Remove container.
(2)Make certain that working areas are clean and clear of tools and miscellaneous items of equipment.
(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4)Close access door 147AL.
(5)Remove access platform.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Blanking Plugs
	B.	Circuit Breaker Safety Clips
	C.	Container
	D.	Warning Notices
	E.	2 Access Platforms 4.5 m (14 ft)
R	F. 98A54003119200	SPECIAL WRENCH
R	G. 98A54003120200	SPECIAL WRENCH
	H. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
	I. Material No. 19-010	Lockwire 0.8 mm (0.032 in.) (Ref. 20-31-00)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 12-36-29, P. Block 1	Hydraulics
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
	- 36-11-00, P. Block 401	Engine Bleed Air Supply System
	- 36-11-15, P. Block 401	Precooler - Bleed Air
	- 54-54-00, P. Block 401	Aft Fairing
	- 71-00-00, P. Block 501	Power Plant - General
	- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job set-up
(1)Open, safety and tag the following circuit breakers :
(a)For Engine 1 Green Pump :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57

(b)For Engine 2 Green Pump :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58

(2)Depressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Depressurize associated hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Display a warning notice on panel 427VU prohibiting operation of the system associated with hydraulic tubes to be removed.
(5)On panel 20VU, pull ENG1 FIRE and ENG2 FIRE handles and display a warning notice prohibiting opening of fire valves.
(6)On HYD PWR section of panel 471VU, check that the fire valves are closed. SHUT legends of FIRE VALVES annunciators are on.
(7)Remove aft fairing (Ref. 54-54-00, P. Block 401).
(8)Remove bleed air precooler (Ref. 36-11-15, P. Block 401).
(9)Remove bleed air precooler cold air inlet duct (Ref. 36-11-00, P. Block 401).
(10)Open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(11)Position two access platforms on each side of pylon.
(12)Remove access panels 473AL (483AL), 415AL (425AL), 474AR (484AR), 416AR (426AR).
(Ref. Fig. 401)
(13)Place a container under tubes to be removed.

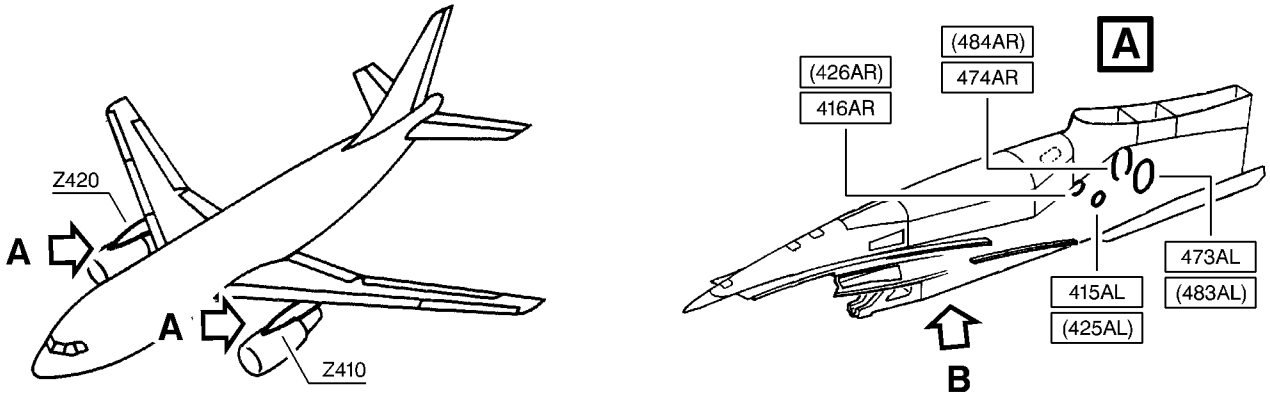
B. Removal

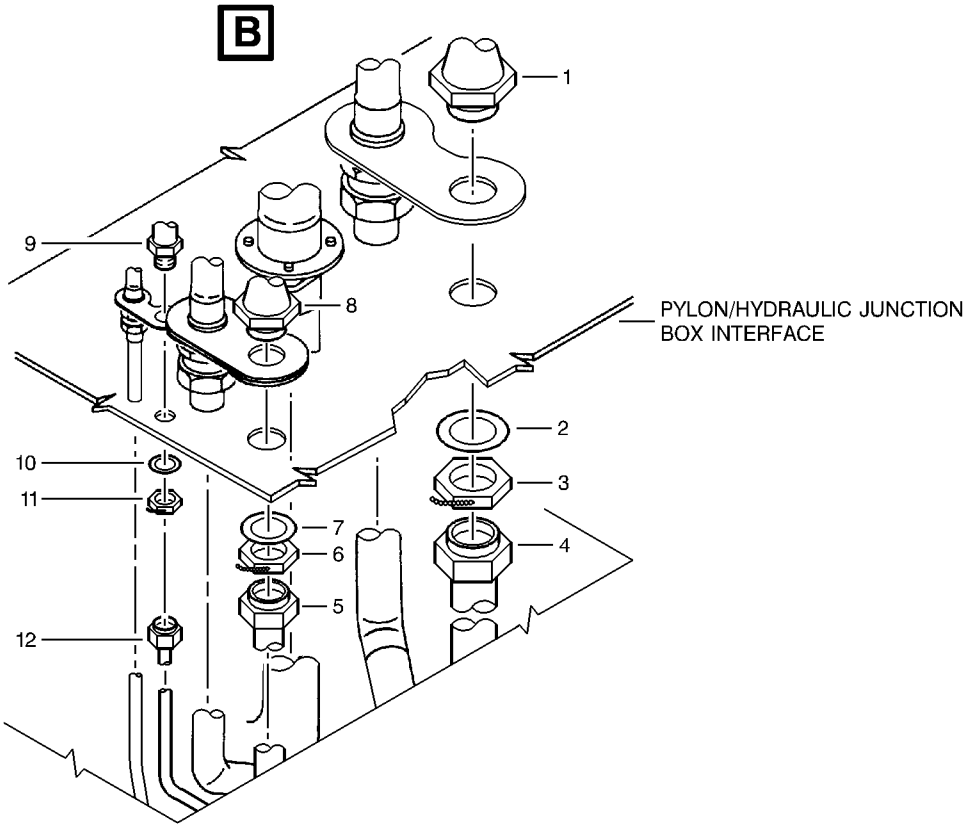
NOTE : Install blanking plugs on disconnected tube ends.

(1)Disconnect tubes at the pylon/hydraulic junction box interface.
(Ref. Fig. 401)

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

(a)Cut, remove and discard lockwire from nut (3).
Loosen suction tube end-fitting (4) and remove nut (3), washer (2) and disconnect suction tube (1).
(b)Cut, remove and discard lockwire from nut (6).
Loosen pressure tube end-fitting (5) and remove nut (6), washer (7) and disconnect pressure tube (8).
(c)Cut, remove and discard lockwire from nut (11).
Loosen case drain tube end-fitting (12) and remove nut (11), washer (10) and disconnect case drain tube (9).
(2)Remove case drain and pressure tubes (aft parts) and remove suction tube clampblocks (rear section).
(Ref. Fig. 402, 403)
(a)Disconnect case drain and pressure tubes at RIB13-14.
(Ref. Fig. 402).





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Hydraulic Tubes Disconnection (Forward Section)
Figure 401

1 Put a container in position.
2 Loosen tube end-fitting (20) and disconnect case drain tube (21) from union (19).
3 Loosen tube end-fitting (22) and disconnect case drain tube (9) from union (23).
R 4 Using special wrench 98A54003120200, loosen nut (17) and disconnect pressure tube (18) from union (16).
5 Cut and remove lockwire and disconnect electrical connector (25) from pressure switch (24).
R 6 Using special wrench 98A54003119200, loosen nut (13) and disconnect pressure tube (8) from union (14) and remove manifold (15).

(b)Remove clampblocks (rear section).
(Ref. Fig. 403)

1 Remove clampblocks at RIB18.
- Cut, remove and discard lockwire from bolts (41) and (43).
- Remove nuts (36), (34) and (46) and spacers (37), (35) and (45).
- Remove the two bolts (41) and washers (42).
- Remove bolt (43) and washer (44).
- Remove clampblocks (38).
- Remove bushings (33), (47) and (48) from tubes (1), (18) and (21) and discard them.

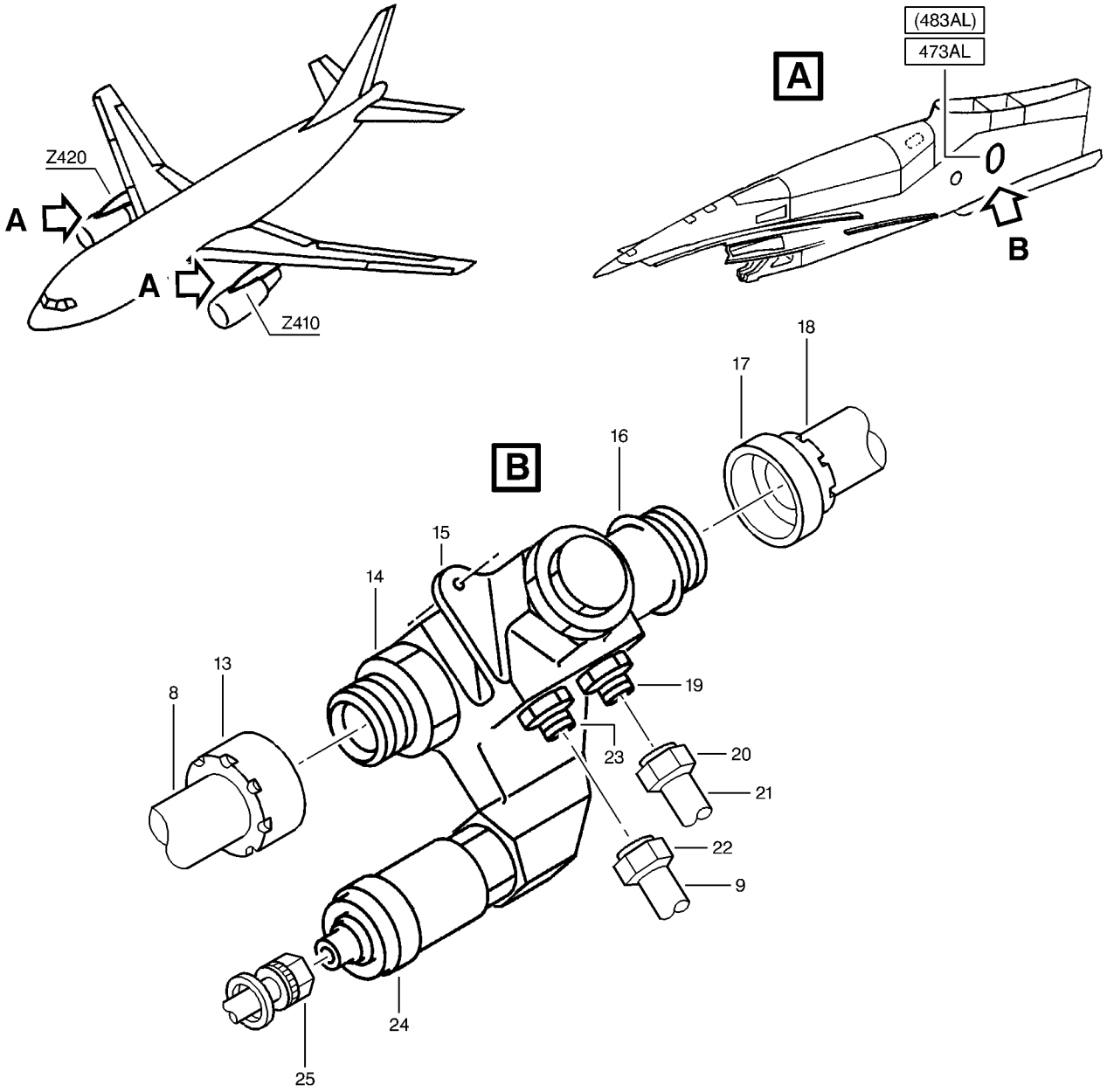
2 Remove clampblocks at RIB16.
- Cut, remove and discard lockwire from bolts (50) and (51).
- Remove the two nuts (56).
- Remove bolt (50) and washer (49).
- Remove bolt (51) and washer (52).
- Remove clampblocks (53).
- Remove bushings (55) and (54) from tubes (18) and (21) and discard them.

3 Remove clampblocks at RIB13 and RIB14.
- Cut, remove and discard lockwire from bolts (30) and (59).
- Remove the three nuts (57).
- Remove the two bolts (30) and washers (31).
- Remove bolt (59) and washer (58).
- Remove clampblocks (32).
- Remove bushings (28), (60) and (61) from tubes (1), (18) and (21) and discard them.
- Cut, remove and discard lockwire from bolts (68) and (65).
- Remove the three nuts (62).
- Remove the two bolts (68), washers (69) and cover (29).
- Remove bolt (65) and washer (66).
- Remove clampblocks (70).
- Remove bushings (67), (64) and (63) from tubes (1), (8) and (9) and discard them.

(c)Remove case drain tube (21) from the rear.
(d)Remove pressure tube (18) from the rear.

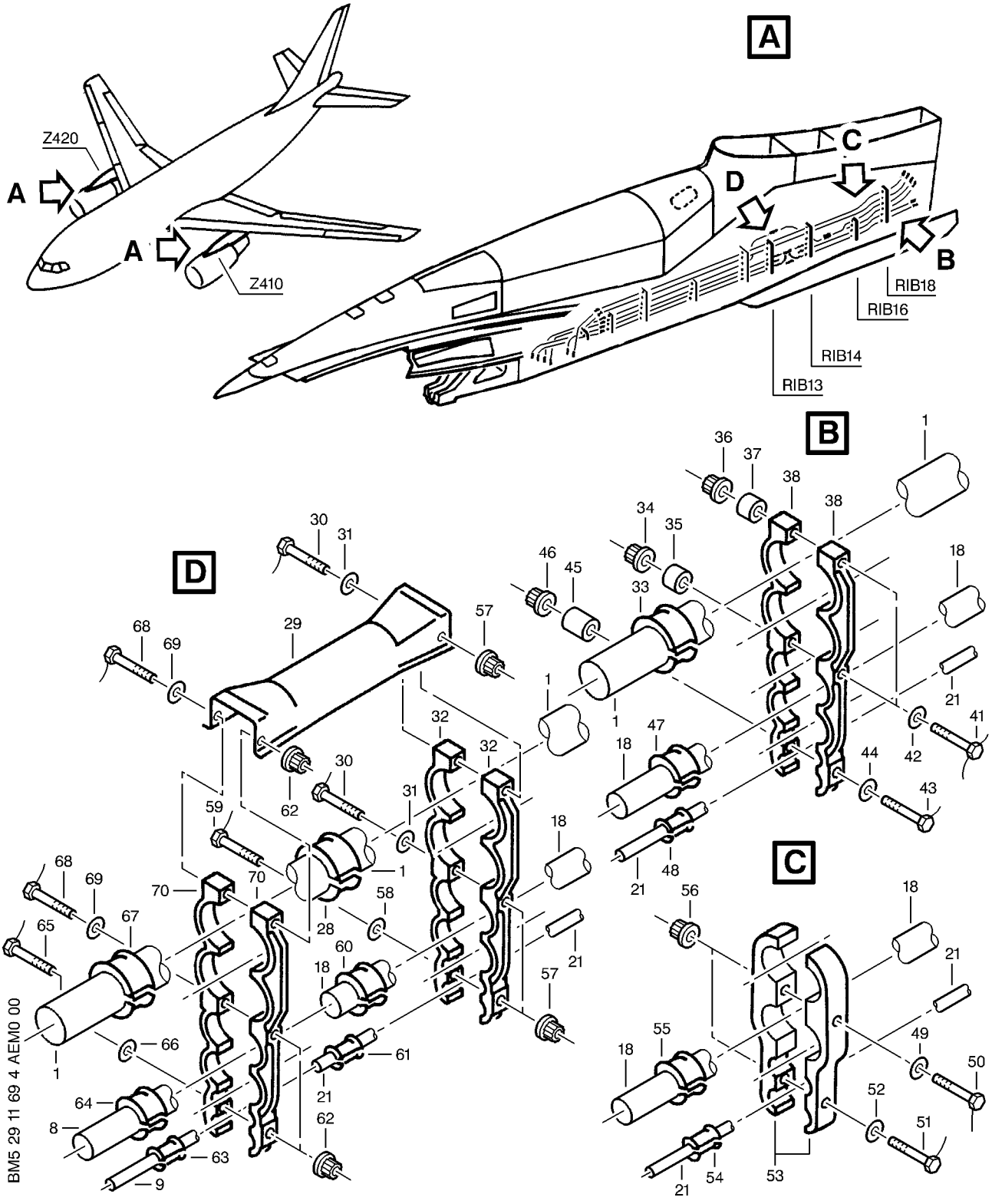
(3)Remove case drain and pressure tubes (forward parts) and remove suction tube clampblocks (front section).
(Ref. Fig. 403, 404, 405)
(Ref. Fig. 406)

(a)Remove clampblocks and bulkhead unit at RIB12 (center section).



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Hydraulic Tubes Disconnection/Connection
Figure 402



Clampblocks Removal/Installation (Rear Section)
Figure 403

(Ref. Fig. 404)

1 Remove clampblocks at RIB12.
- Cut, remove and discard lockwire from bolts (82), (83) and (87).
- Remove nut (78), washer (81) and bolt (82).
- Remove nut (76), washer (84) and bolt (83).
- Remove nut (89), washer (88) and bolt (87).
- Remove clampblocks (90).
- Remove bushings (80), (85) and (86) from tubes (1), (9) and (8) and discard them.

2 Remove bulkhead unit at RIB12.
- Remove the ten nuts (79) and remove brackets (77) and (91).
- Remove the two half-collars (75).
- Remove the ten nuts (71).
- Remove the two half-collars (72), the three parts of plate (73) and the ten spacers (74).

(b) Disconnect bonding leads at RIB7.

(Ref. Fig. 405)

1 Remove nut (106), washer (105), bolt (101) and clamp (102) from suction tube (1) and disconnect bonding leads (103) and (104).

2 Remove nut (107), washer (108), bolt (112) and clamp (111) from pressure tube (8) and disconnect bonding leads (109) and (110).

3 Remove nut (113), washer (114), bolt (117) and clamp (116) from case drain tube (9) and disconnect bonding lead (115).

(c) Remove clampblocks (forward section).

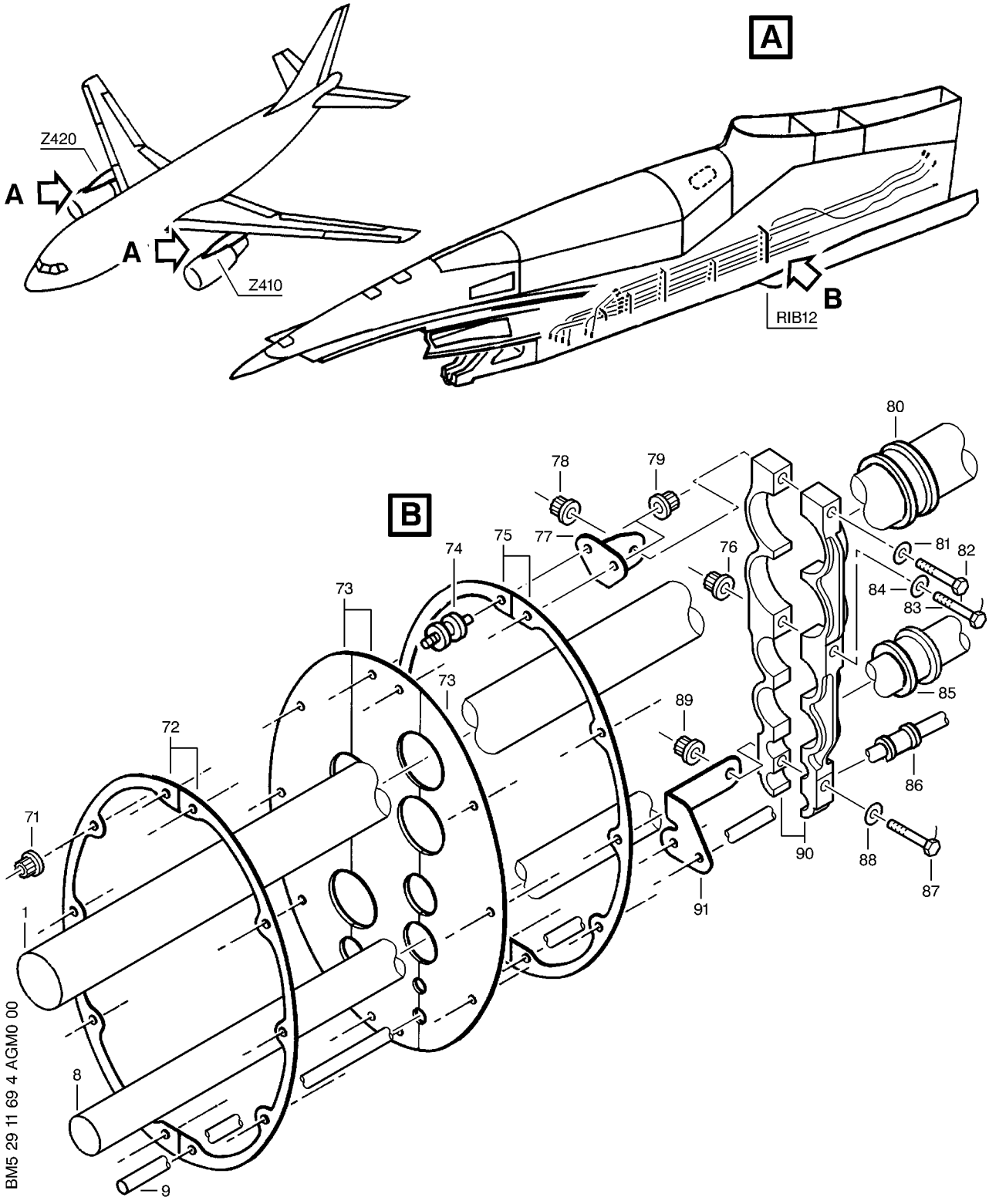
(Ref. Fig. 406)

1 Remove clampblocks at RIB10
- Cut, remove and discard lockwire from bolts (124) and (125).
- Remove the two nuts (122).
- Remove bolt (124) and washer (123).
- Remove bolt (125) and washer (126).
- Remove clampblocks (127).
- Remove bushings (121) and (128) from tubes (8) and (9) and discard them.

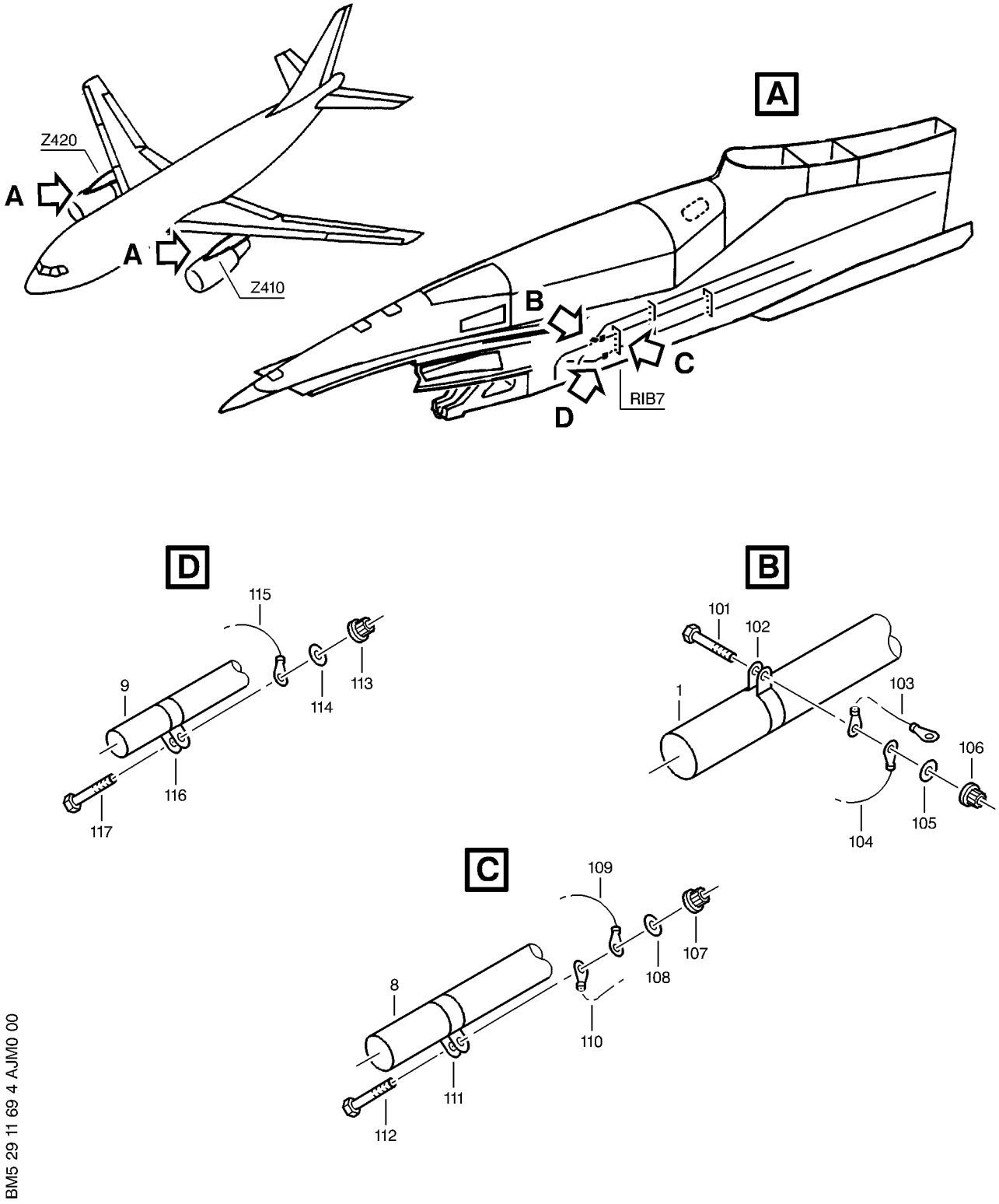
2 Remove clampblocks at RIB9.
- Cut, remove and discard lockwire from bolts (130) and (134).
- Remove the two bolts (130) and washers (131).
- Remove bolt (134) and washer (133).
- Remove clampblocks (132).
- Remove bushings (129), (135) and (136) from tubes (1), (8) and (9) and discard them.

3 Remove clampblocks at RIB7.
- Cut, remove and discard lockwire from bolts (139) and (140).
- Remove the two nuts (137).
- Remove bolt (139) and washer (138).
- Remove bolt (140) and washer (141).
- Remove clampblocks (142).
- Remove bushings (144) and (143) from tubes (8) and (9) and discard them.

4 Remove half-blocks at RIB6.
- Cut, remove and discard lockwire from bolt (148).
- Remove bolt (148) and washer (147).



Clampblocks and Bulkhead Unit (Center Section)
Figure 404



Bonding Leads Disconnection/Connection
Figure 405

- Remove half-blocks (146).
- Remove bushing (145) from case drain tube (9) and discard it.

(d)Remove case drain tube (9) from the rear.
(e)Remove pressure tube (8) from the rear.
(f)Remove suction tube (1) from the rear.

C. Installation

NOTE : Remove blanking plugs from disconnected tube ends.
NOTE : Apply hydraulic fluids (Material No. 02-003) to union threads.

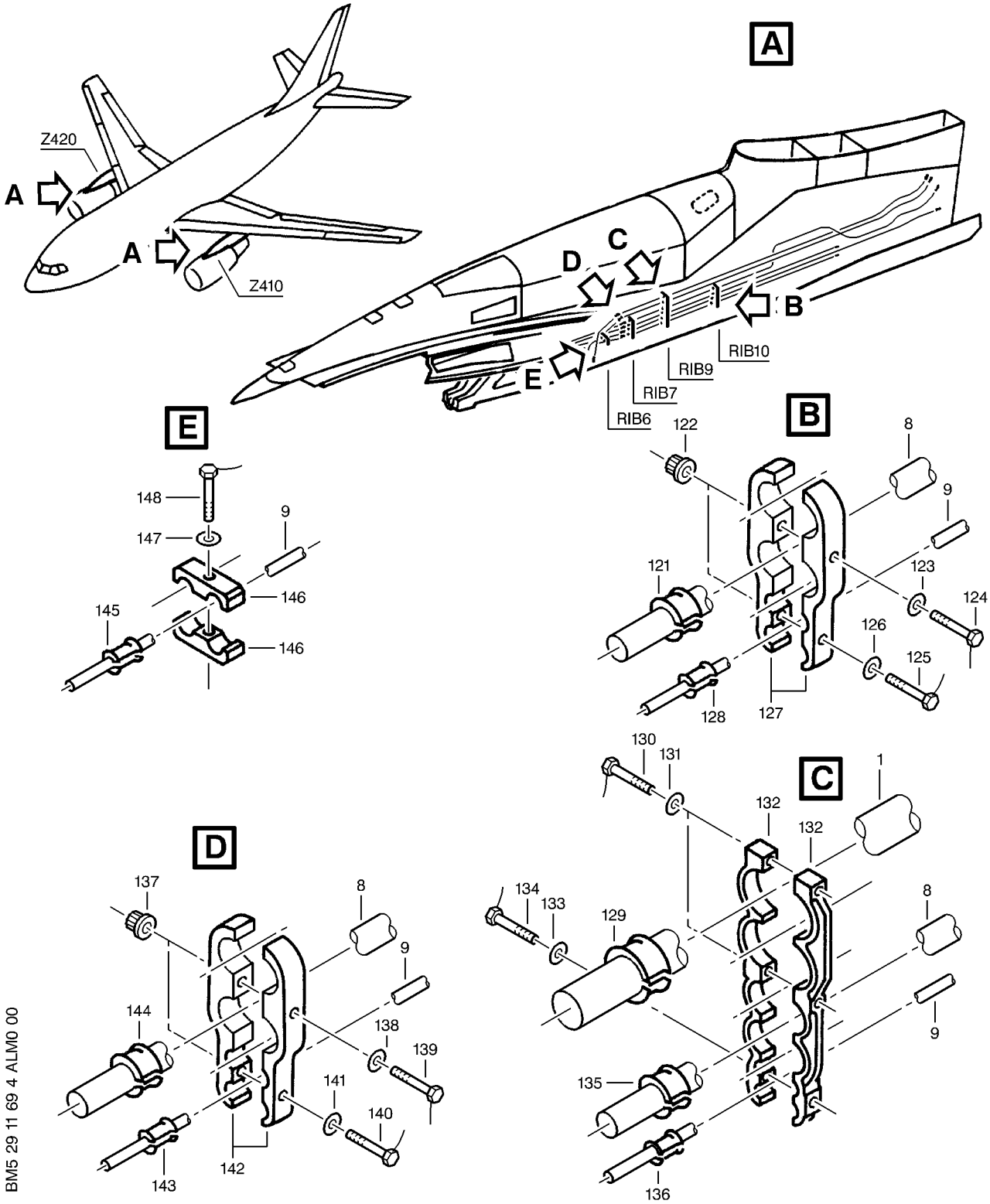
(1)Install case drain and pressure tubes (forward parts) and install suction tube clampblocks (front section).
(Ref. Fig. 403, 404, 405)
(Ref. Fig. 406)
(a)Put in position suction tube (1) from the rear.
(b)Put in position pressure tube (8) from the rear.
(c)Put in position case drain tube (9) from the rear.
(d)Install clampblocks (forward section).
(Ref. Fig. 406)
1 Install half-blocks at RIB6.
- Install new bushing (145) on tube (9).
- Put half-blocks (146) in position.
- Install washer (147) and bolt (148).
- Tighten bolt (148) and safety it with lockwire (Material No. 19-010).

2 Install clampblocks at RIB7.
- Install new bushings (144) and (143) on tubes (8) and (9).
- Put clampblocks (142) in position.
- Install bolt (140) and washer (141).
- Install bolt (139) and washer (138).
- Install the two nuts (137) and tighten them.
- Safety bolts (139) and (140) with lockwire (Material No. 19-010).

3 Install clampblocks at RIB9.
- Install new bushings (129), (135) and (136) on tubes (1), (8) and (9).
- Put clampblocks (132) in position.
- Install bolt (134) and washer (133).
- Install the two bolts (130) and washers (131).
- Tighten bolts (130) and (134) and safety them with lockwire (Material No. 19-010).

4 Install clampblocks at RIB10.
- Install new bushings (121) and (128) on tubes (8) and (9).
- Put clampblocks (127) in position.
- Install bolt (125) and washer (126).
- Install bolt (124) and washer (123).
- Install the two nuts (122) and tighten them.
- Safety bolts (125) and (124) with lockwire (Material No. 19-010).

(e)Connect bonding leads at RIB7.
(Ref. Fig. 405)
1 Install clamp (116) on tube (9).
- Install bolt (117), washer (114) and connect bonding lead (115).
- Install nut (113) and tighten it.



Clampblocks Removal/Installation (Forward Section)
Figure 406

2 Install clamp (111) on tube (8).
- Install bolt (112), washer (108) and connect bonding leads (109) and (110).
- Install nut (107) and tighten it.

3 Install clamp (102) on tube (1).
- Install bolt (101), washer (105) and connect bonding leads (103) and (104).
- Install nut (106) and tighten it.

(f)Install bulkhead unit and clampblocks at RIB12 (center section).
(Ref. Fig. 404)

1 Install bulkhead unit at RIB12.
- Assemble the ten spacers (74) with the three parts of plate (73) and the two half-collars (72).
- Install the ten nuts (71) and tighten them.
- Assemble the two half-collars (75) and the two brackets (77) and (91).
- Install the ten nuts (79) and tighten them.

2 Install clampblocks at RIB12.
- Install new bushings (80), (85) and (86) on tubes (1), (8) and (9).
- Put clampblocks (90) in position.
- Install bolt (82) and washer (81). Assemble with bracket (77) and install nut (78).
- Install bolt (83), washer (84) and nut (76).
- Install bolt (87) and washer (88). Assemble with bracket (91) and install nut (89).
- Tighten nuts (78), (76) and (89).
- Safety bolts (82), (83) and (87) with lockwire (Material No. 19-010).

(2)Install case drain and pressure tubes (aft parts) and install suction tube clampblocks (rear section).
(Ref. Fig. 402, 403)

(a)Put in position case drain tube (21) from the rear.

(b)Put in position pressure tube (18) from the rear.

(c)Install clampblocks (rear section)
(Ref. Fig. 403)

1 Install clampblocks at RIB18.
- Install new bushings (33), (47) and (48) on tubes (1), (18) and (21).
- Put clampblocks (38) in position.
- Install bolt (43) and washer (44).
- Install the two bolts (41) and washers (42).
- Install spacers (37), (35) and (45) and nuts (36), (34) and (46). Tighten nuts.
- Safety bolts (41) and (43) with lockwire (Material No. 19-010).

2 Install clampblocks at RIB16.
- Install new bushings (55) and (54) on tubes (18) and (21).
- Put clampblocks (53) in position.
- Install bolt (51) and washer (52).
- Install bolt (50) and washer (49).
- Install the two nuts (56) and tighten them.
- Safety bolts (51) and (50) with lockwire (Material No. 19-010).

3 Install clampblocks at RIB13 and RIB14.
- Install new bushings (28), (60) and (61) on tubes (1), (18) and (21).
- Install new bushings (67), (64) and (63) on tubes (1), (8) and (9).
- Put clampblocks (70) and (32) in position.
- Install bolt (59) and washer (58).
- Install bolt (65) and washer (66).
- Put cover (29) in position.
- Install the two bolts (30) and washers (31).
- Install the two bolts (68) and washers (69).
- Install nuts (57) and (62) and tighten them.
- Safety bolts (68) and (65) with lockwire (Material No. 19-010).
- Safety bolts (30) and (59) with lockwire (Material No. 19-010).

(d)Connect case drain and pressure tubes at RIB13-14.
(Ref. Fig. 402)

1 Put manifold (15) in position.

2 Connect pressure tube (18) to union (16). Position nut (17) with
R special wrench 98A54003120200 and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

3 Connect pressure tube (8) to union (14). Position nut (13) with
R special wrench 98A54003119200 and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

4 Connect electrical connector (25) to pressure switch (24) and safety it with lockwire (Material No. 19-010).

5 Connect case drain tube (21) to union (19). Position tube end-fitting (20) and TORQUE to between 141 and 150 lbf.in. (1.6 and 1.7 m.daN).

6 Connect case drain tube (9) to union (23). Position tube end-fitting (22) and TORQUE to between 141 and 150 lbf.in. (1.6 and 1.7 m.daN).

(3)Connect tubes at the pylon/hydraulic junction box interface.
(Ref. Fig. 401)

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

(a)Connect case drain tube (9).

1 Install washer (10) and nut (11).

2 Position case drain tube end-fitting (12) and TORQUE to between 256 and 283 lbf.in. (2.9 and 3.2 m.daN).

3 TORQUE nut (11) to 256 lbf.in. (2.9 m.daN).
Safety nut (11) with lockwire (Material No. 19-010).

(b)Connect pressure tube (8).

1 Install washer (7) and nut (6).

2 Position pressure tube end-fitting (5) and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

3 TORQUE nut (6) to 256 lbf.in. (2.9 m.daN).
Safety nut (6) with lockwire (Material No. 19-010).

(c)Connect suction tube (1).

1 Install washer (2) and nut (3).

2 Position suction tube end-fitting (4) and TORQUE to between 1398 and 1601 lbf.in. (15.8 and 18.1 m.daN).

3 TORQUE nut (3) to 1398 lbf.in. (15.8 m.daN).

Safety nut (3) with lockwire (Material No. 19-010).
(4)Install bleed air precooler cold air inlet duct (Ref. 36-11-00, P. Block 401).
(5)Install bleed air precooler (Ref. 36-11-15, P. Block 401).
(6)Install aft fairing (Ref. 54-54-00, P. Block 401).

D. Test
(1)Remove safety clips and tags and close the following circuit breakers :
(a)For Engine 1 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 99GK and 101GK.
(b)For Engine 2 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 100GK and 103GK.
(2)Remove warning notices.
(3)On panel 20VU, push ENG1 FIRE and ENG2 FIRE handles.
(4)On HYD PWR section of panel 471VU, check that the fire valves are open. OPEN legends of FIRE VALVES annunciators are on.
(5)Pressurize associated hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(6)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(7)On ECAM control panel, press HYD pushbutton switch and on panel 427VU, make certain that corresponding ENG PUMP pushbutton switch is pressed (in).
(8)Dry-motor the engine (Ref. 71-00-00, P. Block 501).
(9)Check connections for leakage.
(10)On right ECAM display unit, check that pressure reading is 3000 ± 200 psi (206 ± 13.5 bars) for corresponding hydraulic system.
(11)On overhead panel 427VU, release the corresponding ENG PUMP pushbutton switch (the OFF legend comes on). On right ECAM display unit, check that pressure reading drops to 0 psi (0 bar) for the corresponding hydraulic system.
(12)Stop dry-motoring engine.
(13)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).

E. Close-up
(1)Remove container and make certain that working areas are clean and clear of tools and miscellaneous items of equipment.
(2)Install access panels.
(3)Remove access platforms.
(4)Close thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

HYDRAULIC TUBES - PYLON - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Blanking Plugs
	B.	Circuit Breaker Safety Clips
	C.	Containers
	D.	Warning Notices
	E.	2 Access Platforms 4.5 m (14 ft)
R	F. 98A54003119200	SPECIAL WRENCH
R	G. 98A54003120200	SPECIAL WRENCH
	H. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
	I. Material No. 19-010	Lockwire 0.8 mm (0.032 in.) (Ref. 20-31-00)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 12-36-29, P. Block 1	Hydraulics
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
	- 36-11-00, P. Block 401	Engine Bleed Air Supply System
	- 36-11-15, P. Block 401	Precooler - Bleed Air
	- 54-54-00, P. Block 401	Aft Fairing
	- 71-00-00, P. Block 501	Power Plant - General
	- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job set-up

(1)Open, safety and tag the following circuit breakers :

(a)For Engine 1 Green Pump :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57

(b)For Engine 2 Green Pump :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58

(2)Depressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Depressurize associated hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Display a warning notice on panel 427VU prohibiting operation of the system associated with hydraulic tubes to be removed.
(5)On panel 20VU, pull ENG1 FIRE and ENG2 FIRE handles and display a warning notice prohibiting opening of fire valves.
(6)On HYD PWR section of panel 471VU, check that the fire valves are closed. SHUT legends of FIRE VALVES annunciators are on.
(7)Remove aft fairing (Ref. 54-54-00, P. Block 401).
(8)Remove bleed air precooler (Ref. 36-11-15, P. Block 401).
(9)Remove bleed air precooler cold air inlet duct (Ref. 36-11-00, P. Block 401).
(10)Open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(11)Position two access platforms on each side of pylon.
(12)Remove access panels 473AL (483AL), 415AL (425AL), 474AR (484AR), 416AR (426AR).
(Ref. Fig. 401)
(13)Place a container under tubes to be removed.

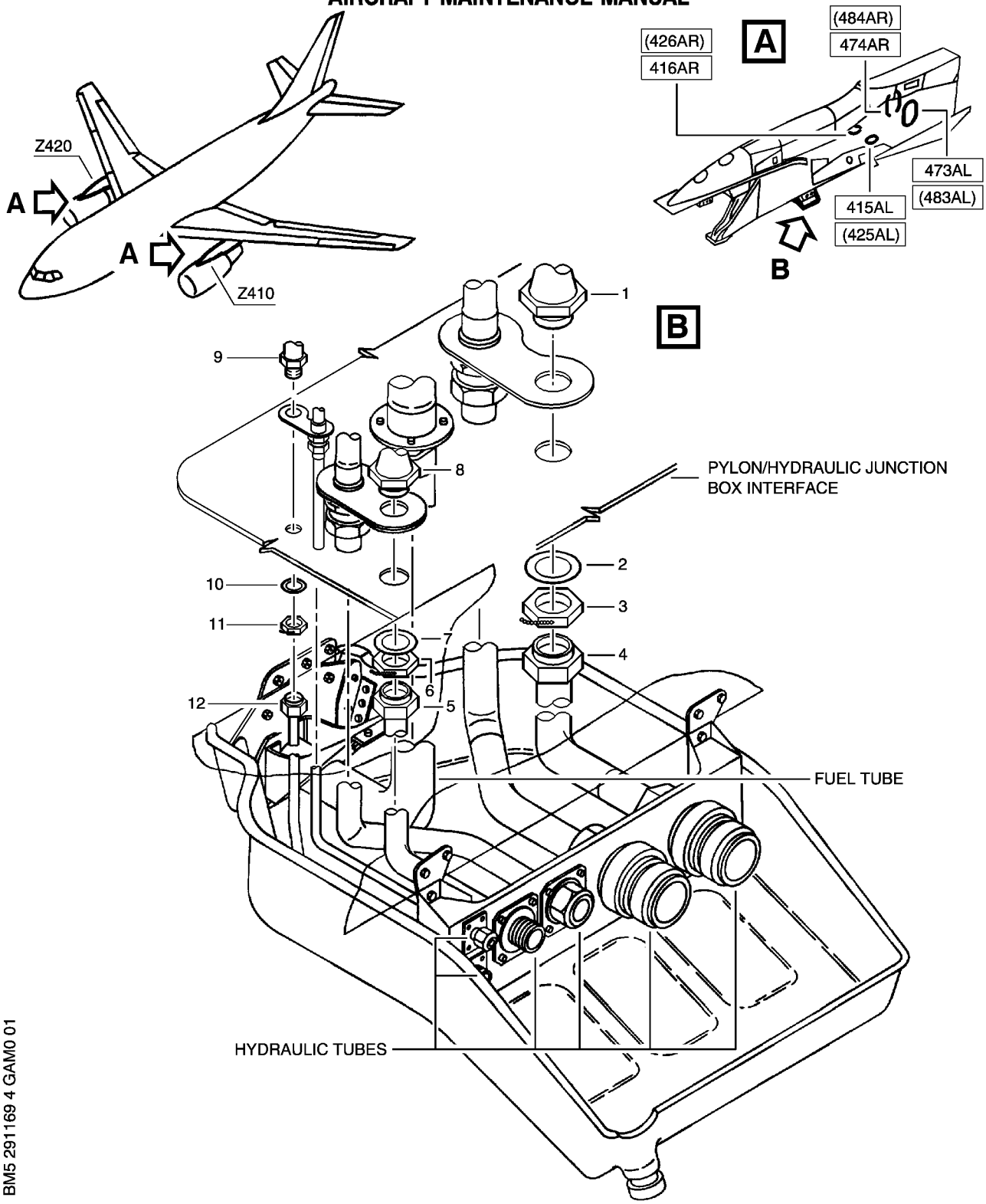
B. Removal

NOTE : Install blanking plugs on disconnected tube ends.

(1)Disconnect tubes at the pylon/hydraulic junction box interface.
(Ref. Fig. 401)

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

(a)Cut, remove and discard lockwire from nut (3).
Loosen suction tube end-fitting (4) and remove nut (3), washer (2) and disconnect suction tube (1).
(b)Cut, remove and discard lockwire from nut (6).
Loosen pressure tube end-fitting (5) and remove nut (6), washer (7) and disconnect pressure tube (8).
(c)Cut, remove and discard lockwire from nut (11).
Loosen case drain tube end-fitting (12) and remove nut (11), washer (10) and disconnect case drain tube (9).
(2)Remove case drain and pressure tubes (aft parts) and remove suction tube clampblocks (rear section).
(Ref. Fig. 402, 403)
(a)Disconnect case drain and pressure tubes at RIB13-14.
(Ref. Fig. 402).



Hydraulic Tubes Disconnection (Forward Section)
Figure 401

R

1 Put a container in position.
2 Loosen tube end-fitting (20) and disconnect case drain tube (21) from union (19).
3 Loosen tube end-fitting (22) and disconnect case drain tube (9) from union (23).
R 4 Using special wrench 98A54003120200, loosen nut (17) and disconnect pressure tube (18) from union (16).
5 Cut and remove lockwire and disconnect electrical connector (25) from pressure switch (24).
R 6 Using special wrench 98A54003119200, loosen nut (13) and disconnect pressure tube (8) from union (14) and remove manifold (15).

(b)Remove clampblocks (rear section).
(Ref. Fig. 403)

1 Remove clampblocks at RIB18.
- Cut, remove and discard lockwire from bolts (41) and (43).
- Remove nuts (36), (34) and (46) and spacers (37), (35) and (45).
- Remove the two bolts (41) and washers (42).
- Remove bolt (43) and washer (44).
- Remove clampblocks (38).
- Remove bushings (33), (47) and (48) from tubes (1), (18) and (21) and discard them.

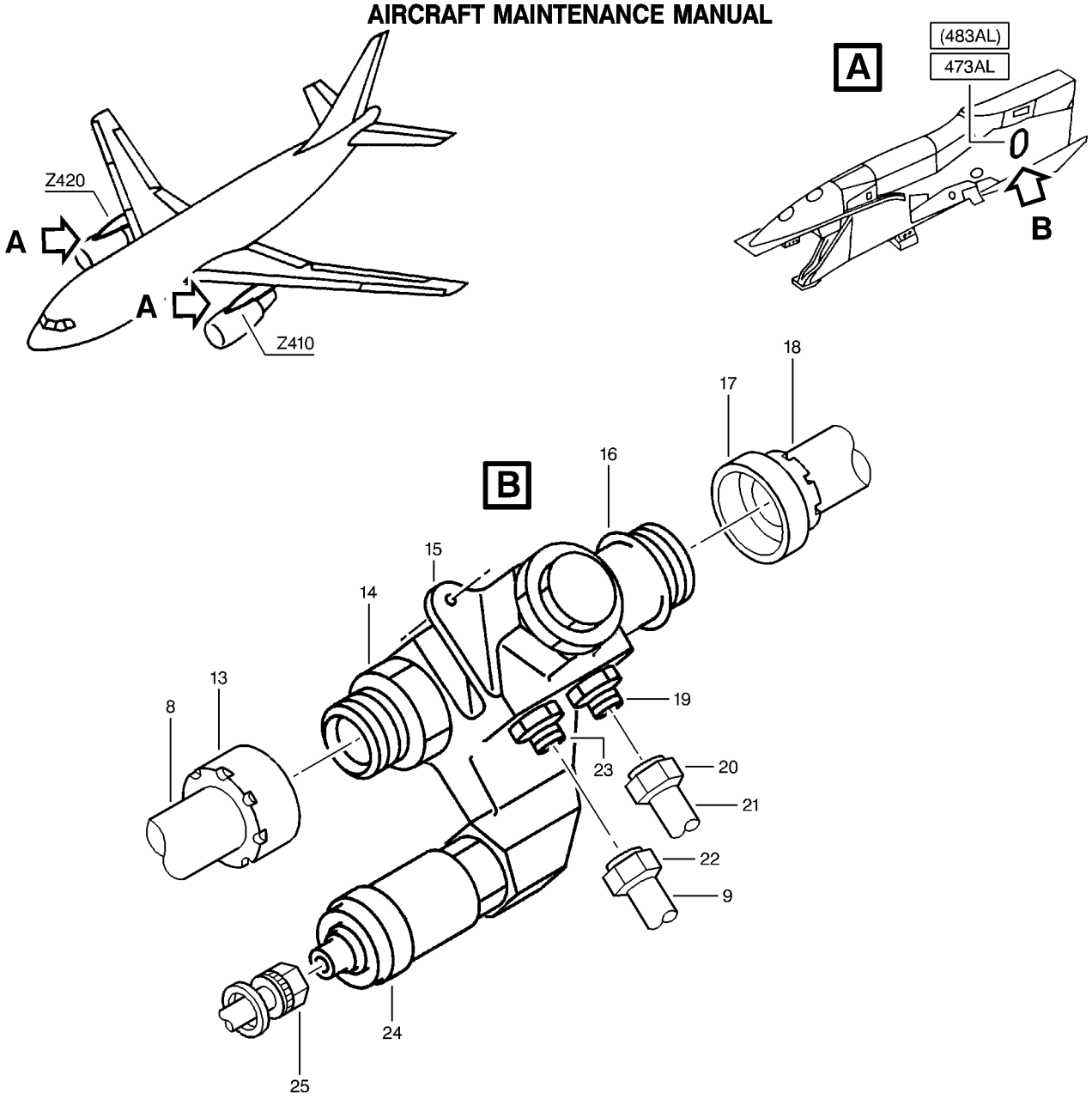
2 Remove clampblocks at RIB16.
- Cut, remove and discard lockwire from bolts (50) and (51).
- Remove the two nuts (56).
- Remove bolt (50) and washer (49).
- Remove bolt (51) and washer (52).
- Remove clampblocks (53).
- Remove bushings (55) and (54) from tubes (18) and (21) and discard them.

3 Remove clampblocks at RIB13 and RIB14.
- Cut, remove and discard lockwire from bolts (30) and (59).
- Remove the three nuts (57).
- Remove the two bolts (30) and washers (31).
- Remove bolt (59) and washer (58).
- Remove clampblocks (32).
- Remove bushings (28), (60) and (61) from tubes (1), (18) and (21) and discard them.
- Cut, remove and discard lockwire from bolts (68) and (65).
- Remove the three nuts (62).
- Remove the two bolts (68), washers (69) and cover (29).
- Remove bolt (65) and washer (66).
- Remove clampblocks (70).
- Remove bushings (67), (64) and (63) from tubes (1), (8) and (9) and discard them.

(c)Remove case drain tube (21) from the rear.
(d)Remove pressure tube (18) from the rear.

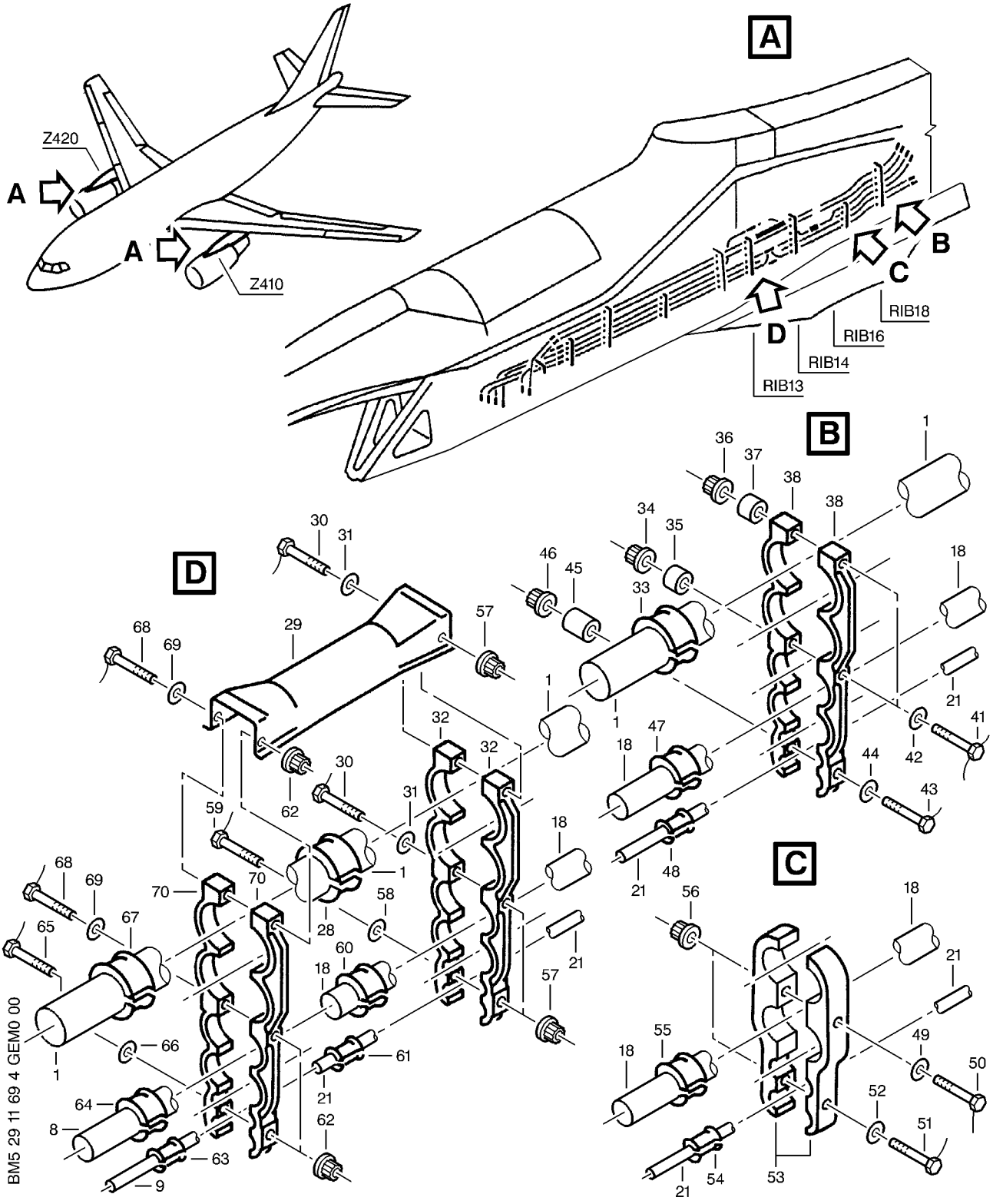
(3)Remove case drain and pressure tubes (forward parts) and remove suction tube clampblocks (front section).
(Ref. Fig. 403, 404, 405)
(Ref. Fig. 406)

(a)Remove clampblocks and bulkhead unit at RIB12 (center section).



BM5 29 11 69 4 GCM0 00

Hydraulic Tubes Disconnection/Connection
Figure 402



Clampblocks Removal/Installation (Rear Section)
Figure 403

(Ref. Fig. 404)

1 Remove clampblocks at RIB12.
- Cut, remove and discard lockwire from bolts (82), (83) and (87).
- Remove nut (78), washer (81) and bolt (82).
- Remove nut (76), washer (84) and bolt (83).
- Remove nut (89), washer (88) and bolt (87).
- Remove clampblocks (90).
- Remove bushings (80), (85) and (86) from tubes (1), (9) and (8) and discard them.

2 Remove bulkhead unit at RIB12.
- Remove the ten nuts (79) and remove brackets (77) and (91).
- Remove the two half-collars (75).
- Remove the ten nuts (71).
- Remove the two half-collars (72), the three parts of plate (73) and the ten spacers (74).

(b) Disconnect bonding leads at RIB7.

(Ref. Fig. 405)

1 Remove nut (106), washer (105), bolt (101) and clamp (102) from suction tube (1) and disconnect bonding leads (103) and (104).

2 Remove nut (107), washer (108), bolt (112) and clamp (111) from pressure tube (8) and disconnect bonding leads (109) and (110).

3 Remove nut (113), washer (114), bolt (117) and clamp (116) from case drain tube (9) and disconnect bonding lead (115).

(c) Remove clampblocks (forward section).

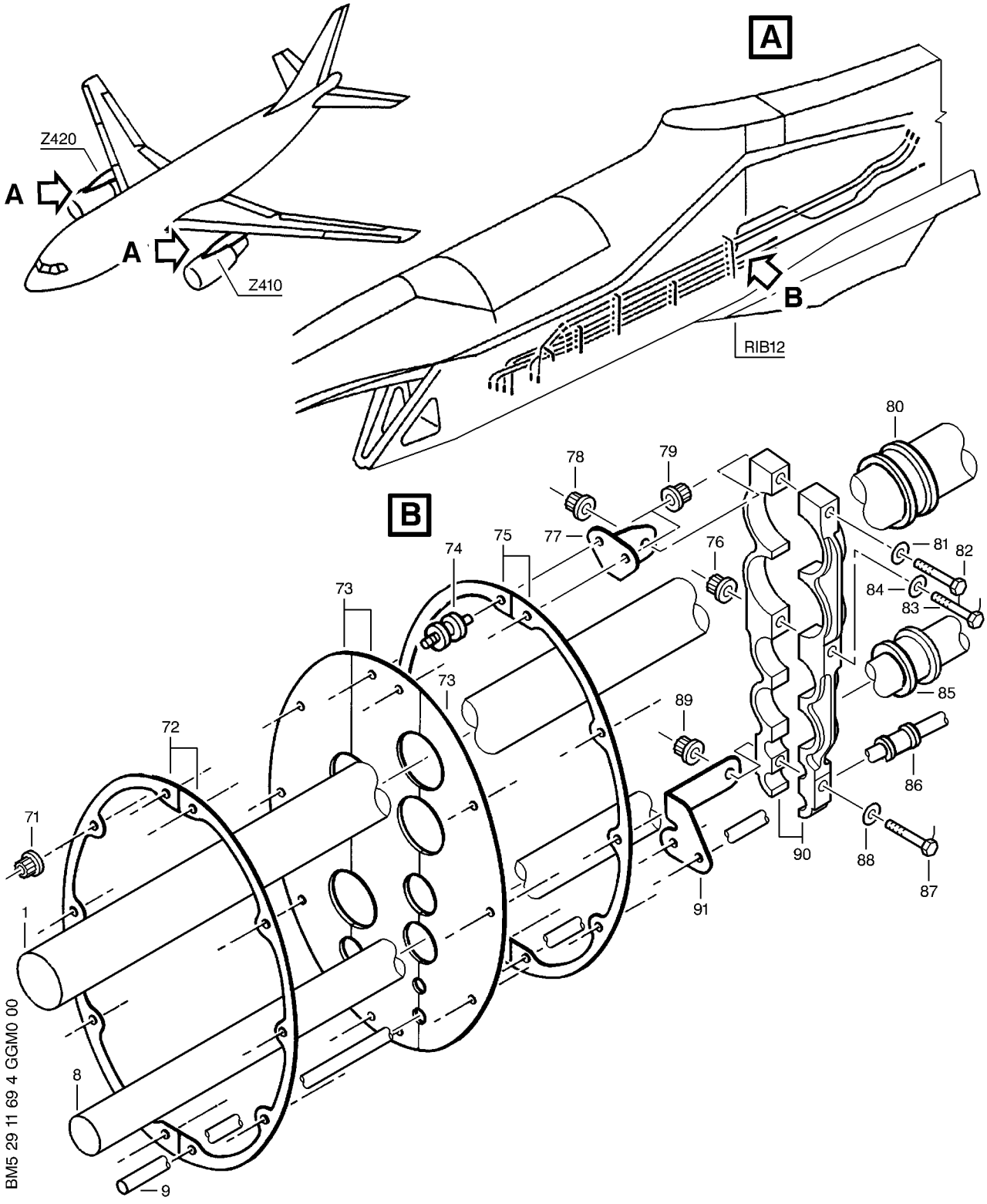
(Ref. Fig. 406)

1 Remove clampblocks at RIB10
- Cut, remove and discard lockwire from bolts (124) and (125).
- Remove the two nuts (122).
- Remove bolt (124) and washer (123).
- Remove bolt (125) and washer (126).
- Remove clampblocks (127).
- Remove bushings (121) and (128) from tubes (8) and (9) and discard them.

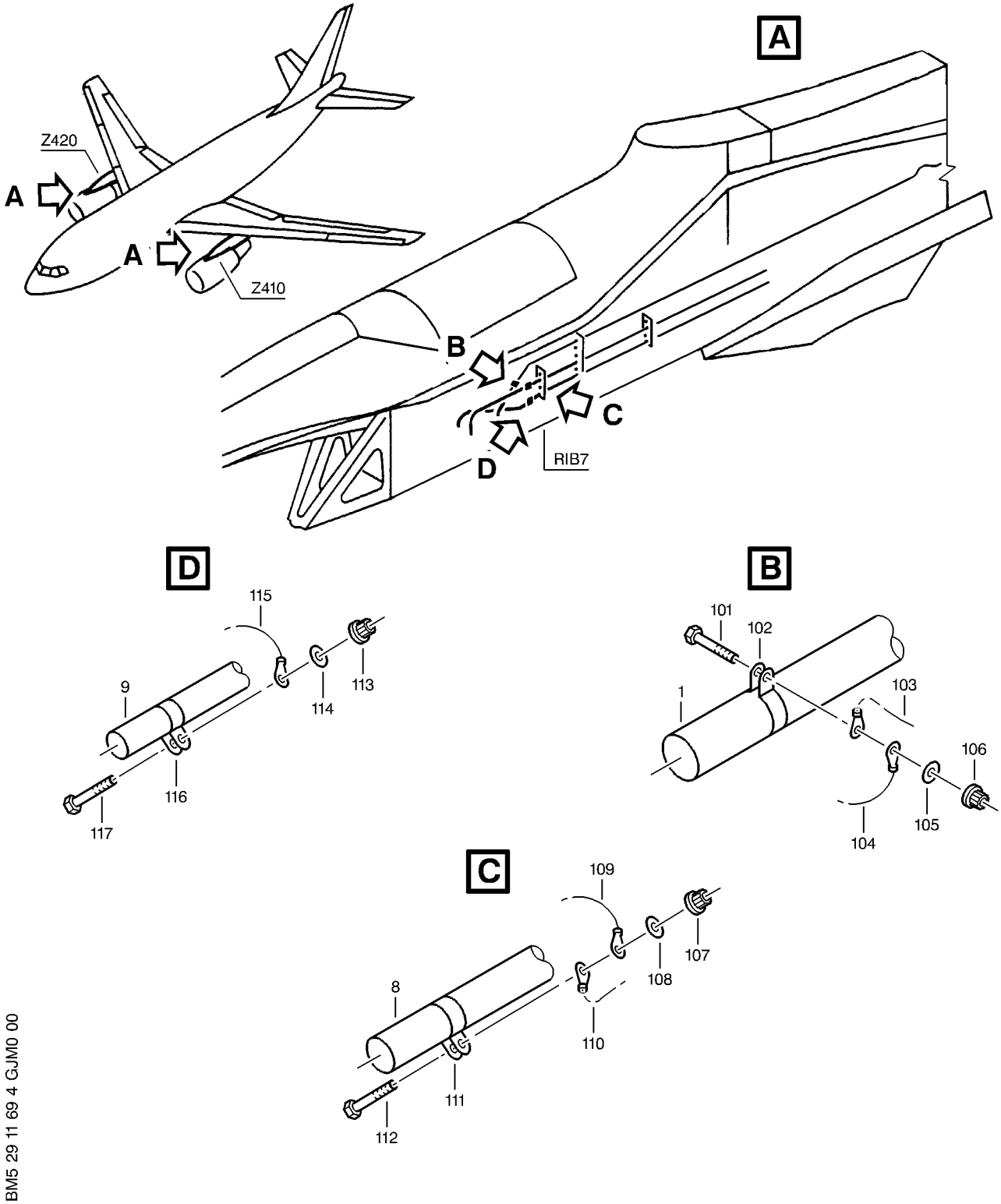
2 Remove clampblocks at RIB9.
- Cut, remove and discard lockwire from bolts (130) and (134).
- Remove the two bolts (130) and washers (131).
- Remove bolt (134) and washer (133).
- Remove clampblocks (132).
- Remove bushings (129), (135) and (136) from tubes (1), (8) and (9) and discard them.

3 Remove clampblocks at RIB7.
- Cut, remove and discard lockwire from bolts (139) and (140).
- Remove the two nuts (137).
- Remove bolt (139) and washer (138).
- Remove bolt (140) and washer (141).
- Remove clampblocks (142).
- Remove bushings (144) and (143) from tubes (8) and (9) and discard them.

4 Remove half-blocks at RIB6.
- Cut, remove and discard lockwire from bolt (148).
- Remove bolt (148) and washer (147).



Clampblocks and Bulkhead Unit (Center Section)
Figure 404



Bonding Leads Disconnection/Connection
Figure 405

- Remove half-blocks (146).
- Remove bushing (145) from case drain tube (9) and discard it.

(d)Remove case drain tube (9) from the rear.
(e)Remove pressure tube (8) from the rear.
(f)Remove suction tube (1) from the rear.

C. Installation

NOTE : Remove blanking plugs from disconnected tube ends.
NOTE : Apply hydraulic fluids (Material No. 02-003) to union threads.

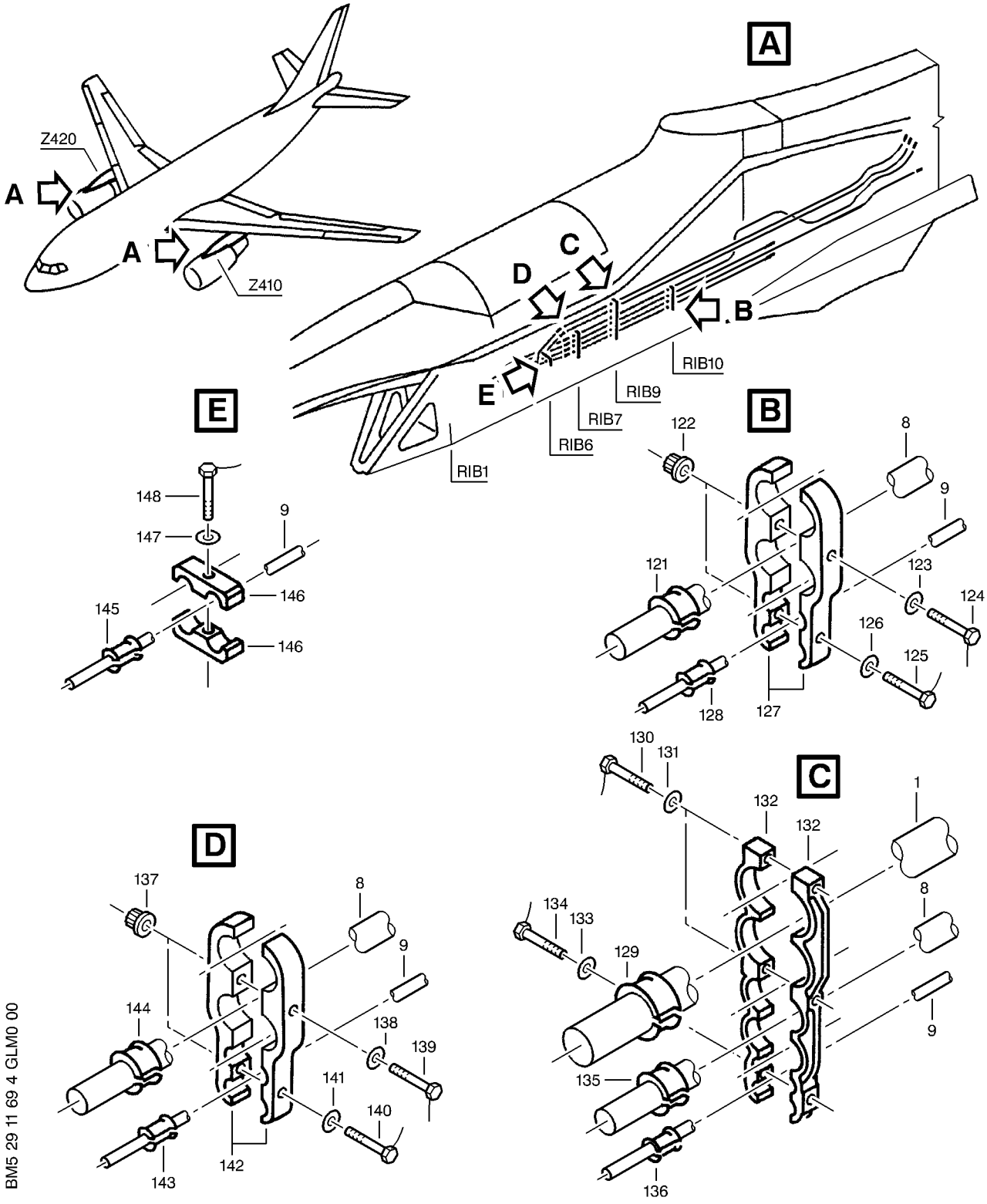
(1)Install case drain and pressure tubes (forward parts) and install suction tube clampblocks (front section).
(Ref. Fig. 403, 404, 405)
(Ref. Fig. 406)
(a)Put in position suction tube (1) from the rear.
(b)Put in position pressure tube (8) from the rear.
(c)Put in position case drain tube (9) from the rear.
(d)Install clampblocks (forward section).
(Ref. Fig. 406)
1 Install half-blocks at RIB6.
- Install new bushing (145) on tube (9).
- Put half-blocks (146) in position.
- Install washer (147) and bolt (148).
- Tighten bolt (148) and safety it with lockwire (Material No. 19-010).

2 Install clampblocks at RIB7.
- Install new bushings (144) and (143) on tubes (8) and (9).
- Put clampblocks (142) in position.
- Install bolt (140) and washer (141).
- Install bolt (139) and washer (138).
- Install the two nuts (137) and tighten them.
- Safety bolts (139) and (140) with lockwire (Material No. 19-010).

3 Install clampblocks at RIB9.
- Install new bushings (129), (135) and (136) on tubes (1), (8) and (9).
- Put clampblocks (132) in position.
- Install bolt (134) and washer (133).
- Install the two bolts (130) and washers (131).
- Tighten bolts (130) and (134) and safety them with lockwire (Material No. 19-010).

4 Install clampblocks at RIB10.
- Install new bushings (121) and (128) on tubes (8) and (9).
- Put clampblocks (127) in position.
- Install bolt (125) and washer (126).
- Install bolt (124) and washer (123).
- Install the two nuts (122) and tighten them.
- Safety bolts (125) and (124) with lockwire (Material No. 19-010).

(e)Connect bonding leads at RIB7.
(Ref. Fig. 405)
1 Install clamp (116) on tube (9).
- Install bolt (117), washer (114) and connect bonding lead (115).
- Install nut (113) and tighten it.



Clampblocks Removal/Installation (Forward Section)
Figure 406

2 Install clamp (111) on tube (8).
- Install bolt (112), washer (108) and connect bonding leads (109) and (110).
- Install nut (107) and tighten it.

3 Install clamp (102) on tube (1).
- Install bolt (101), washer (105) and connect bonding leads (103) and (104).
- Install nut (106) and tighten it.

(f)Install bulkhead unit and clampblocks at RIB12 (center section).
(Ref. Fig. 404)

1 Install bulkhead unit at RIB12.
- Assemble the ten spacers (74) with the three parts of plate (73) and the two half-collars (72).
- Install the ten nuts (71) and tighten them.
- Assemble the two half-collars (75) and the two brackets (77) and (91).
- Install the ten nuts (79) and tighten them.

2 Install clampblocks at RIB12.
- Install new bushings (80), (85) and (86) on tubes (1), (8) and (9).
- Put clampblocks (90) in position.
- Install bolt (82) and washer (81). Assemble with bracket (77) and install nut (78).
- Install bolt (83), washer (84) and nut (76).
- Install bolt (87) and washer (88). Assemble with bracket (91) and install nut (89).
- Tighten nuts (78), (76) and (89).
- Safety bolts (82), (83) and (87) with lockwire (Material No. 19-010).

(2)Install case drain and pressure tubes (aft parts) and install suction tube clampblocks (rear section).
(Ref. Fig. 402, 403)

(a)Put in position case drain tube (21) from the rear.

(b)Put in position pressure tube (18) from the rear.

(c)Install clampblocks (rear section).
(Ref. Fig. 403)

1 Install clampblocks at RIB18.
- Install new bushings (33), (47) and (48) on tubes (1), (18) and (21).
- Put clampblocks (38) in position.
- Install bolt (43) and washer (44).
- Install the two bolts (41) and washers (42).
- Install spacers (37), (35) and (45) and nuts (36), (34) and (46). Tighten nuts.
- Safety bolts (41) and (43) with lockwire (Material No. 19-010).

2 Install clampblocks at RIB16.
- Install new bushings (55) and (54) on tubes (18) and (21).
- Put clampblocks (53) in position.
- Install bolt (51) and washer (52).
- Install bolt (50) and washer (49).
- Install the two nuts (56) and tighten them.
- Safety bolts (51) and (50) with lockwire (Material No. 19-010).

3 Install clampblocks at RIB13 and RIB14.
- Install new bushings (28), (60) and (61) on tubes (1), (18) and (21).
- Install new bushings (67), (64) and (63) on tubes (1), (8) and (9).
- Put clampblocks (70) and (32) in position.
- Install bolt (59) and washer (58).
- Install bolt (65) and washer (66).
- Put cover (29) in position.
- Install the two bolts (30) and washers (31).
- Install the two bolts (68) and washers (69).
- Install nuts (57) and (62) and tighten them.
- Safety bolts (68) and (65) with lockwire (Material No. 19-010).
- Safety bolts (30) and (59) with lockwire (Material No. 19-010).

(d)Connect case drain and pressure tubes at RIB13-14.
(Ref. Fig. 402)

1 Put manifold (15) in position.

2 Connect pressure tube (18) to union (16). Position nut (17) with
R special wrench 98A54003120200 and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

3 Connect pressure tube (8) to union (14). Position nut (13) with
R special wrench 98A54003119200 and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

4 Connect electrical connector (25) to pressure switch (24) and safety it with lockwire (Material No. 19-010).

5 Connect case drain tube (21) to union (19). Position tube end-fitting (20) and TORQUE to between 141 and 150 lbf.in. (1.6 and 1.7 m.daN).

6 Connect case drain tube (9) to union (23). Position tube end-fitting (22) and TORQUE to between 141 and 150 lbf.in. (1.6 and 1.7 m.daN).

(3)Connect tubes at the pylon/hydraulic junction box interface.
(Ref. Fig. 401)

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

(a)Connect case drain tube (9).

1 Install washer (10) and nut (11).

2 Position case drain tube end-fitting (12) and TORQUE to between 256 and 283 lbf.in. (2.9 and 3.2 m.daN).

3 TORQUE nut (11) to 256 lbf.in. (2.9 m.daN).
Safety nut (11) with lockwire (Material No. 19-010).

(b)Connect pressure tube (8).

1 Install washer (7) and nut (6).

2 Position pressure tube end-fitting (5) and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

3 TORQUE nut (6) to 256 lbf.in. (2.9 m.daN).
Safety nut (6) with lockwire (Material No. 19-010).

(c)Connect suction tube (1).

1 Install washer (2) and nut (3).

2 Position suction tube end-fitting (4) and TORQUE to between 1398 and 1601 lbf.in. (15.8 and 18.1 m.daN).

3 TORQUE nut (3) to 1398 lbf.in. (15.8 m.daN).

Safety nut (3) with lockwire (Material No. 19-010).
(4)Install bleed air precooler cold air inlet duct (Ref. 36-11-00, P. Block 401).
(5)Install bleed air precooler (Ref. 36-11-15, P. Block 401).
(6)Install aft fairing (Ref. 54-54-00, P. Block 401).

D. Test
(1)Remove safety clips and tags and close the following circuit breakers :
(a)For Engine 1 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 99GK and 101GK.
(b)For Engine 2 Green Pump :
- 1GE, 2GE, 4GE, 5GD, 100GK and 103GK.
(2)Remove warning notices.
(3)On panel 20VU, push ENG1 FIRE and ENG2 FIRE handles.
(4)On HYD PWR section of panel 471VU, check that the fire valves are open. OPEN legends of FIRE VALVES annunciators are on.
(5)Pressurize associated hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(6)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(7)On ECAM control panel, press HYD pushbutton switch and on panel 427VU, make certain that corresponding ENG PUMP pushbutton switch is pressed (in).
(8)Dry-motor the engine (Ref. 71-00-00, P. Block 501).
(9)Check connections for leakage.
(10)On right ECAM display unit, check that pressure reading is 3000 ± 200 psi (206 ± 13.5 bars) for corresponding hydraulic system.
(11)On overhead panel 427VU, release the corresponding ENG PUMP pushbutton switch (the OFF legend comes on). On right ECAM display unit, check that pressure reading drops to 0 psi (0 bar) for the corresponding hydraulic system.
(12)Stop dry-motoring engine.
(13)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).

E. Close-up
(1)Remove container and make certain that working areas are clean and clear of tools and miscellaneous items of equipment.
(2)Install access panels.
(3)Remove access platforms.
(4)Close thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

BLUE MAIN HYDRAULIC POWER - DESCRIPTION AND OPERATION

1. General

- This system is the least complex of the three.
- It supplies only the flight controls.
- It is pressurized by :
  . the pump driven by the L engine
  . the Green/Blue power transfer unit
  . a ground power cart.

The self-sealing connectors for connection of ground power carts are located in a service panel under the L wing. These connectors include one for connection of pneumatic ground equipment, used to pressurize the three reservoirs simultaneously.

2. Component Location
(Ref. Fig. 001)
(Ref. Fig. 002)
(Ref. Fig. 003)
(Ref. Fig. 004)

**ON A/C 001-100,

(Ref. Fig. 005)

**ON A/C 101-200,

(Ref. Fig. 006)

**ON A/C ALL

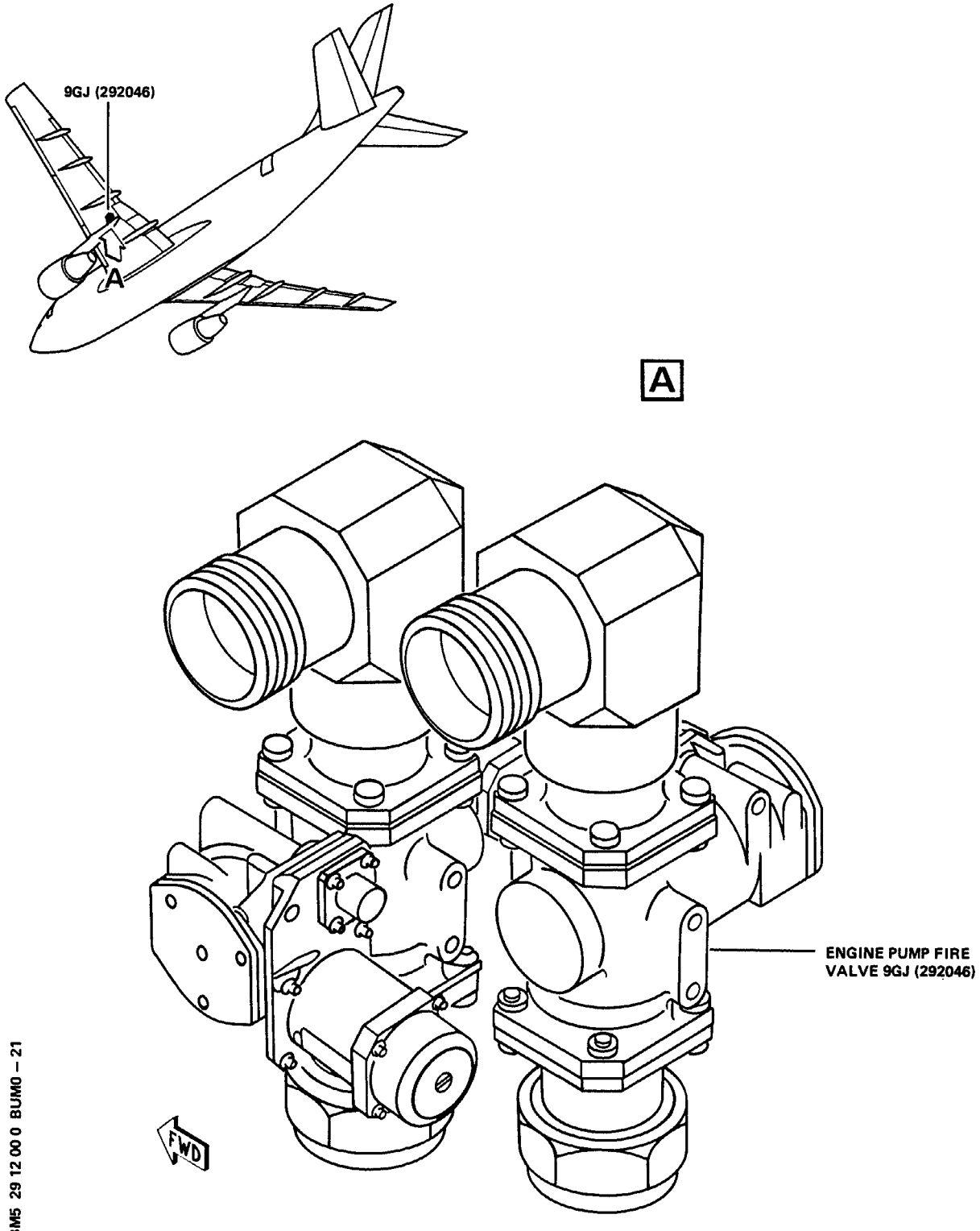
	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	292000	RESERVOIR-HYDRAULIC, BLUE		571	571BB	29-11-11
	292002	FILTER-RSVR RETURN, BLUE		571	571BB	29-11-15
	292005	VALVE-DEPRESS/RELIEF, B RSVR		571	571DB	29-12-21
	292006	GROUND CONNECTOR-SUCTION, B		571	571DB	29-12-63
	292008	GROUND CONNECTOR-DELIVERY, B		571	571DB	29-12-63
	292010	MANIFOLD-SERVO CONTROLS, B		571	734	29-12-34
	292030	PUMP-BLUE, ENG1		435	435AL	29-11-32
	9GJ	VALVE-BLUE PUMP FIRE, ENG1		575	575AL	29-11-33
	292040	VALVE-NON RETURN		420		
	292048	FILTER-B PUMP DELIVERY, ENG1		571		29-11-42
	292060	MANIFOLD-HP, BLUE		571	734	29-12-12
	292063	RELIEF VALVE-BLUE PUMP DELIVERY		571		29-11-55
	292064	PRIORITY VALVE-BLUE		571		27-14-14
R	292070	ACCU-BLUE PWR		571	734	29-11-56
R	292071	AIR CHARGING VALVE		571	734	29-32-25
R	292072	PRESS GAGE-BLUE ACCU		571	734	29-32-21
	29WW	PRESS SWITCH-HP MANIFOLD, B		571		29-12-12
	292004	MANIFOLD-LP, BLUE		571		29-12-16
	292095	CHECK VALVE-G/B PTU DELIVERY		147	734	29-12-12
	292050	CHECK VALVE-B PUMP DELIVERY, ENG 1		147	734	29-12-34
	292014	CHECK VALVE-CASE DRAIN, B		147	734	29-12-16
	292022	CHECK VALVE-RETURN, B LP MANIFOLD		147	734	29-12-16
	33GJ	PRESS SWITCH-B PUMP, ENG1		473	473AL	29-12-62

**ON A/C 101-200,

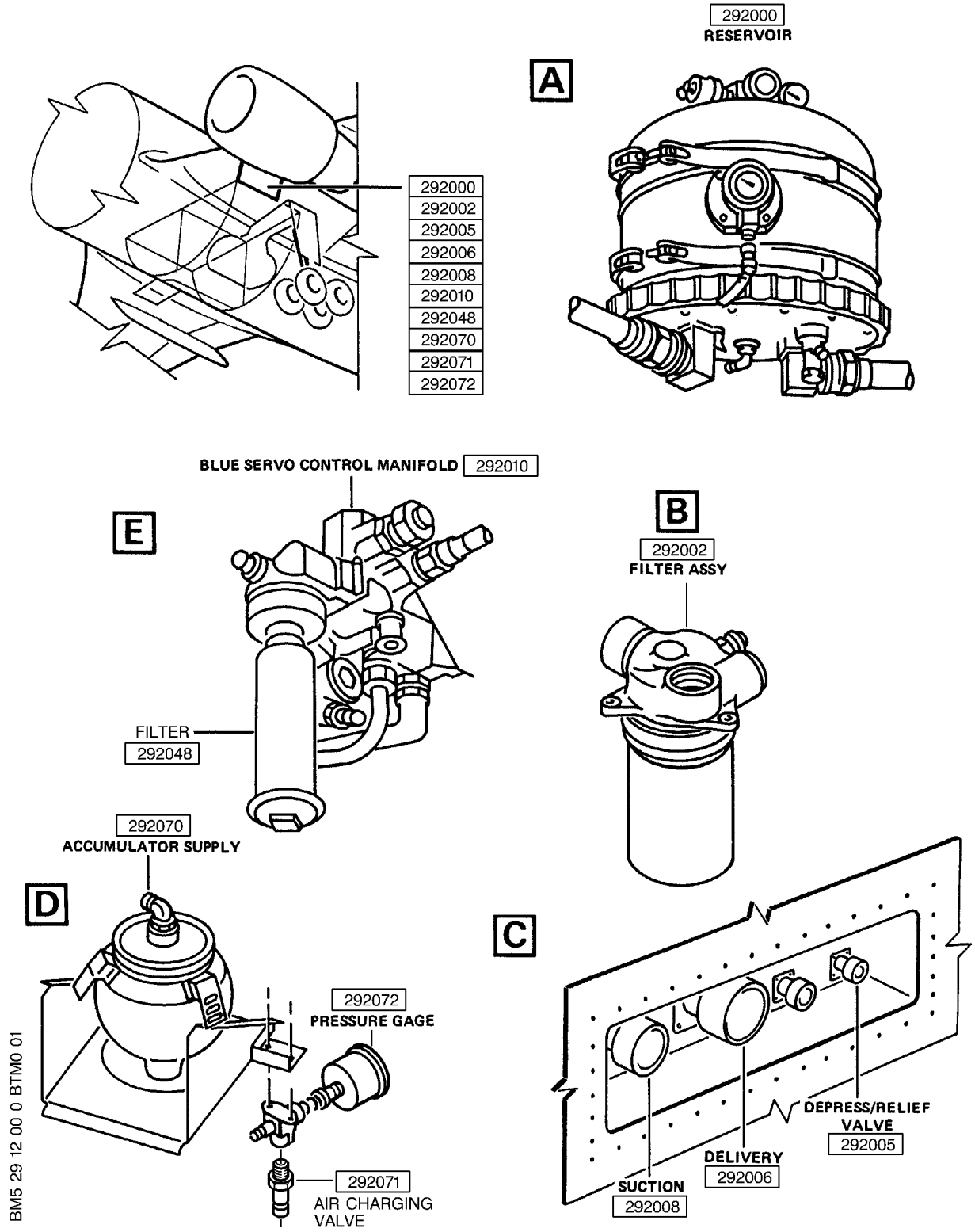
		FILTERS-ENGINE - PUMP CASE DRAIN		435	435AL	29-11-36

**ON A/C 001-100,

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	FILTERS-ENGINE PUMP CASE DRAIN		452	452AR	29-11-36

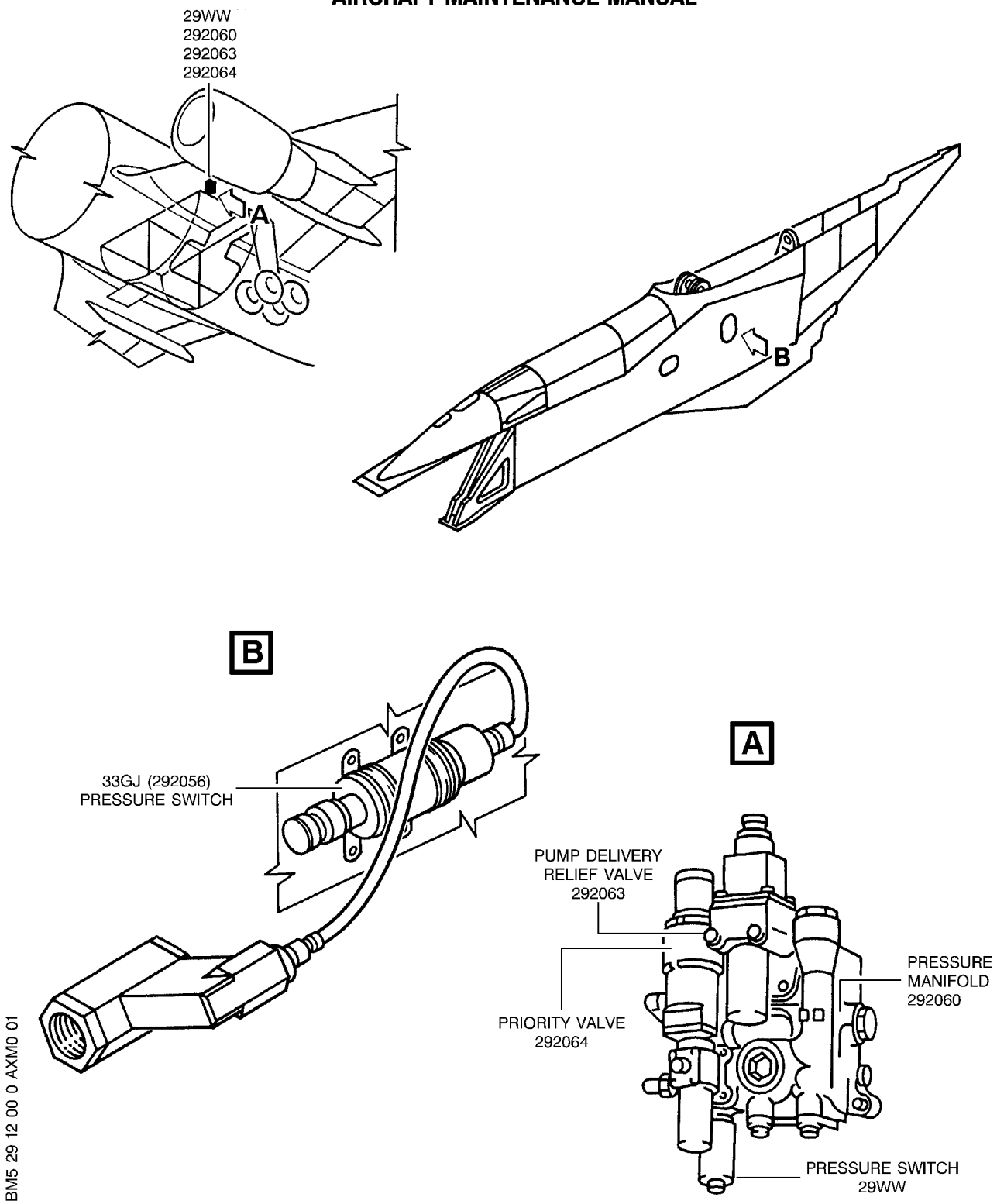


Component Location
Figure 001

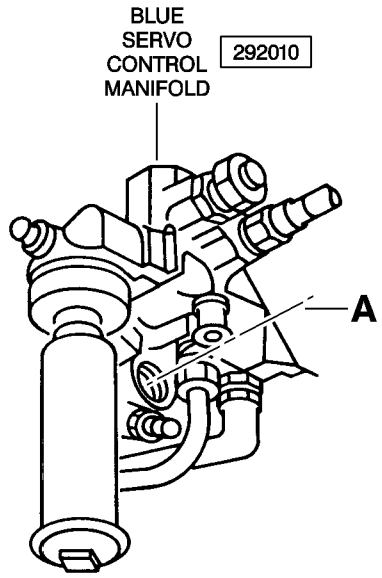


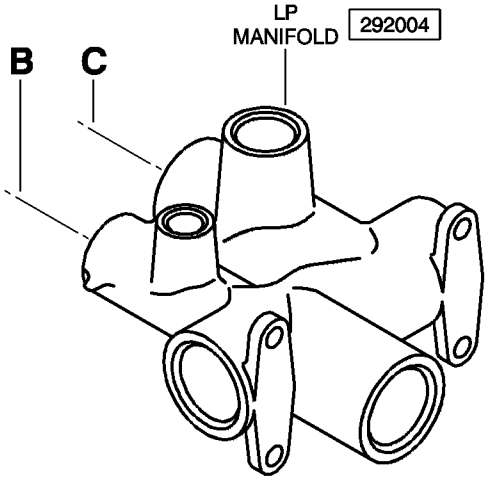
Component Location
Figure 002

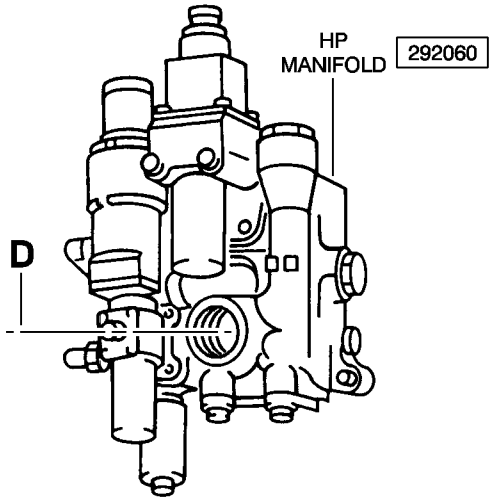
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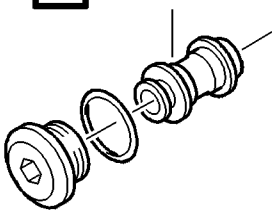


Component Location
Figure 003









A CHECK VALVE - B PUMP DELIVERY, ENG 1 292050

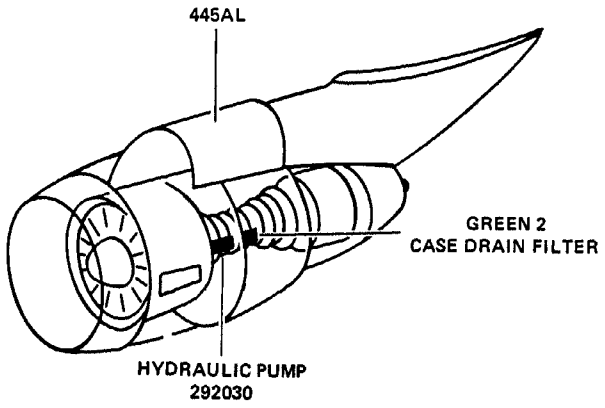
B CHECK VALVE - CASE DRAIN, B 292014

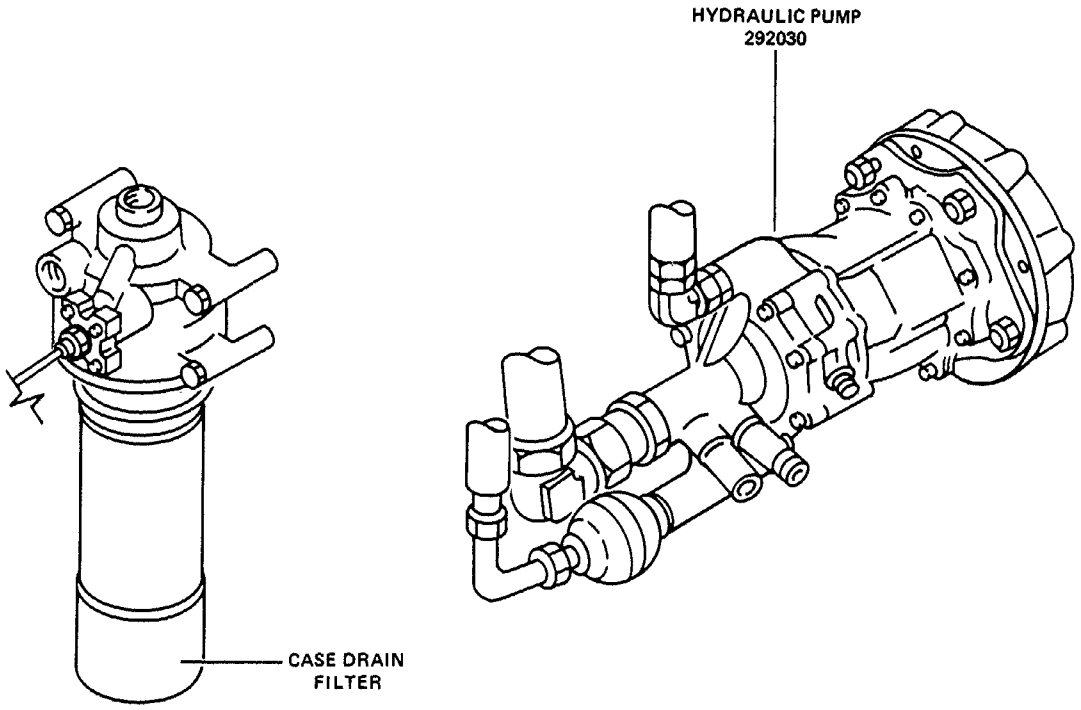
C CHECK VALVE - RETURN, B LP MANIFOLD 292022

D CHECK VALVE - G/B PTU DELIVERY 292095

BM5 29 12 00 0 DRM0 02

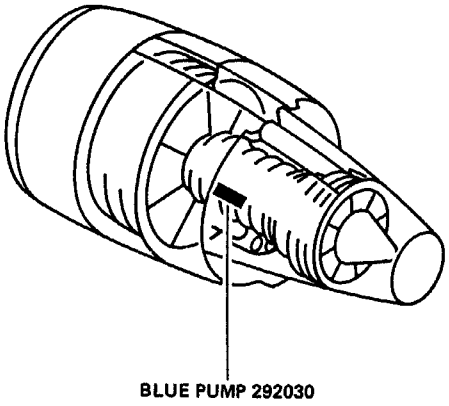
Component Location
Figure 004

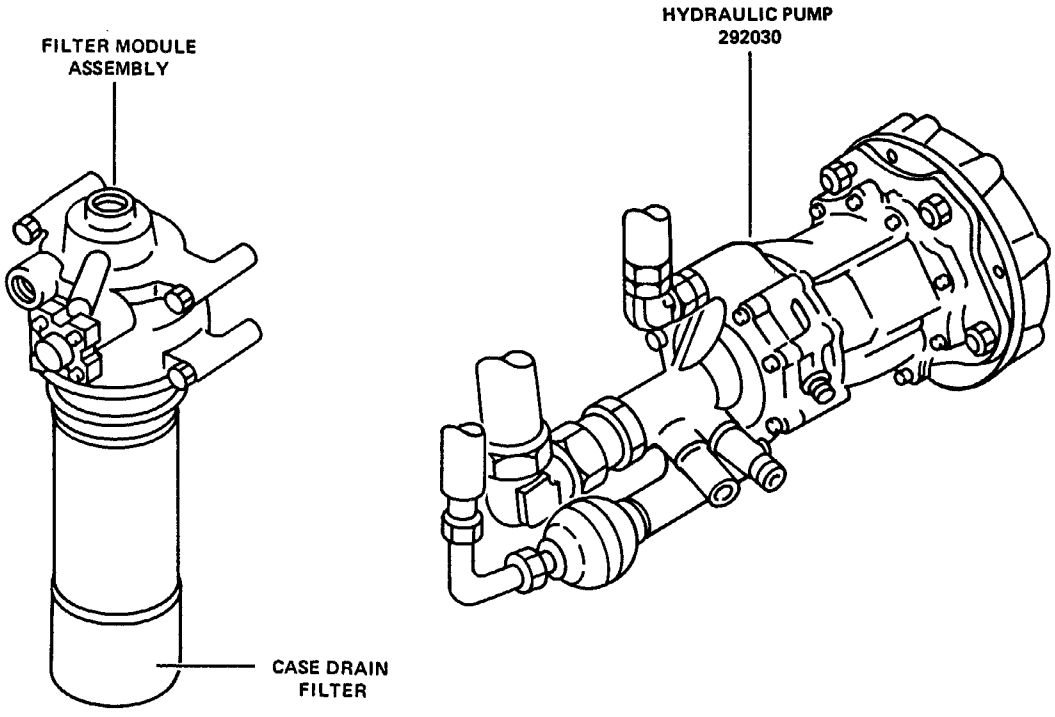




BM5 29 12 00 0 BYM0 – 01/30

Component Location
Figure 005





BM5 29 12 00 0 BGM0 – 21

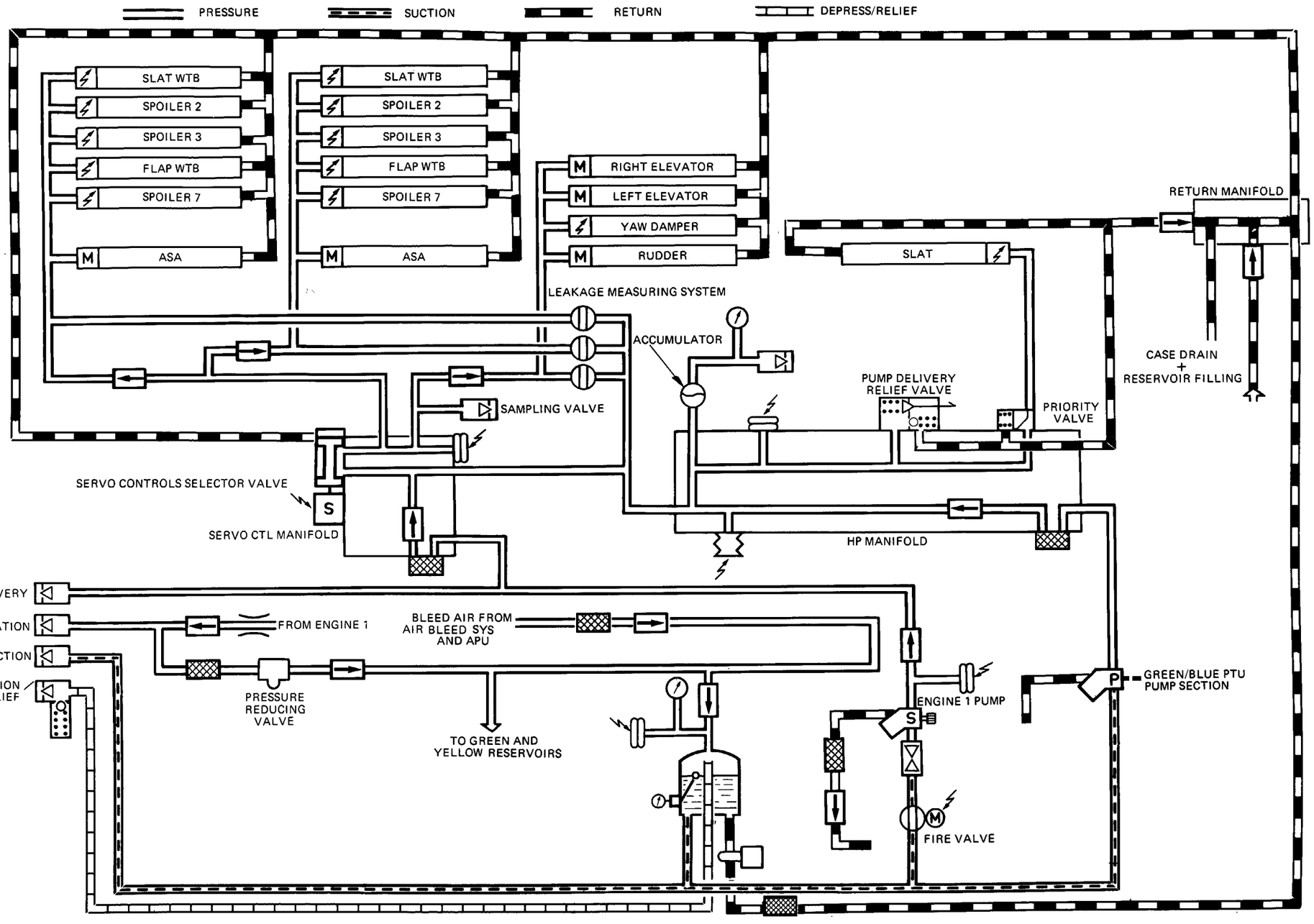
Component Location
Figure 006

**ON A/C ALL

3. Users
(Ref. Fig. 007)
(Ref. Fig. 008)
(Ref. Fig. 009)

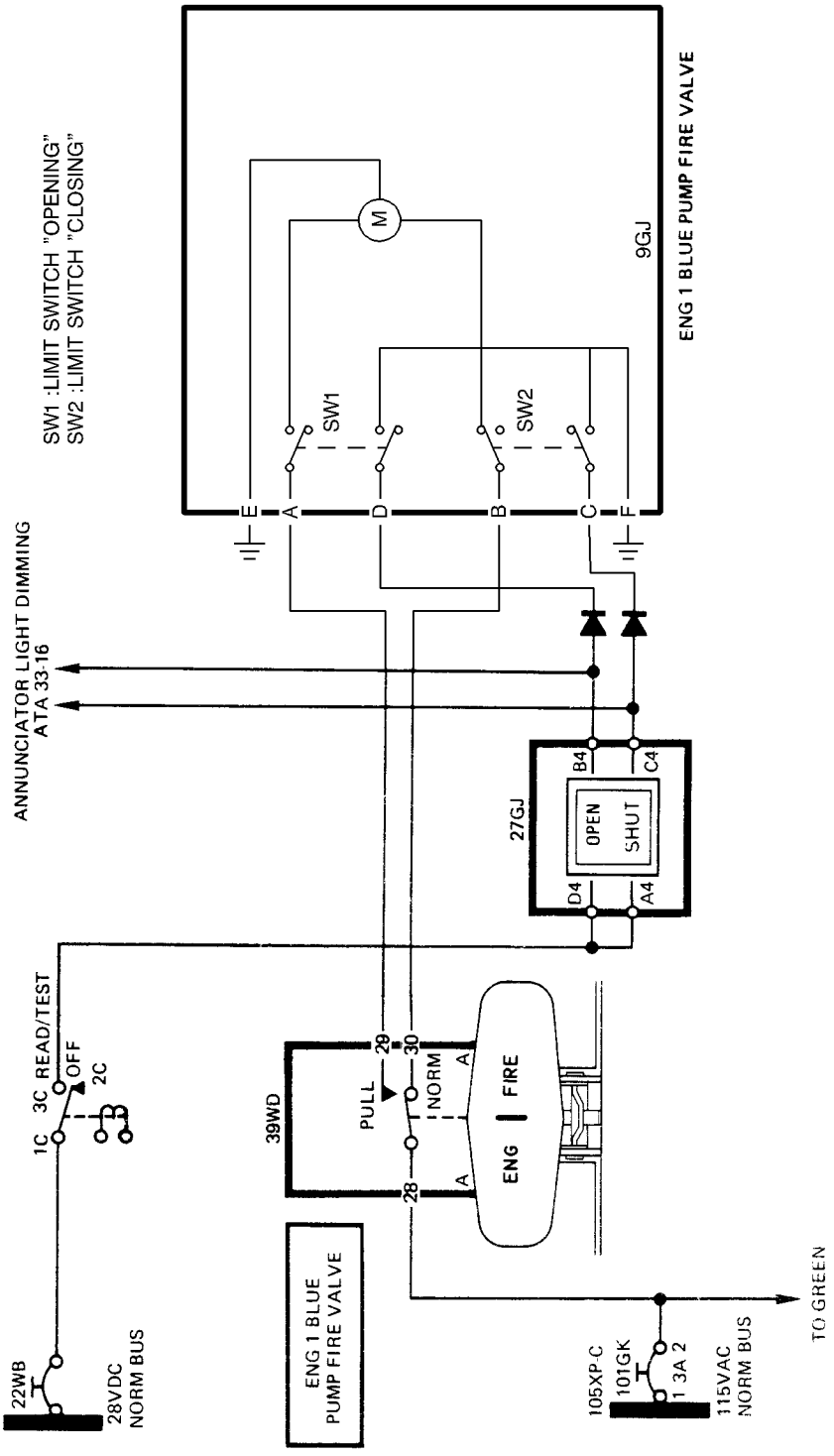
A. Supplied through the servo controls manifold (or through wing and aft fuselage isolation valves).
. Two all speed aileron servo controls (L and R ASA)
. Two elevator servo controls (L and R)
. One rudder servo control
. Six actuators on L and R spoilers 2, 3 and 7
. Four L and R slat and flap wing tip brake pistons
. One yaw damper actuator servo motor.

B. Supplied through the HP manifold, via a priority valve :
. One slat power control unit hydraulic motor.



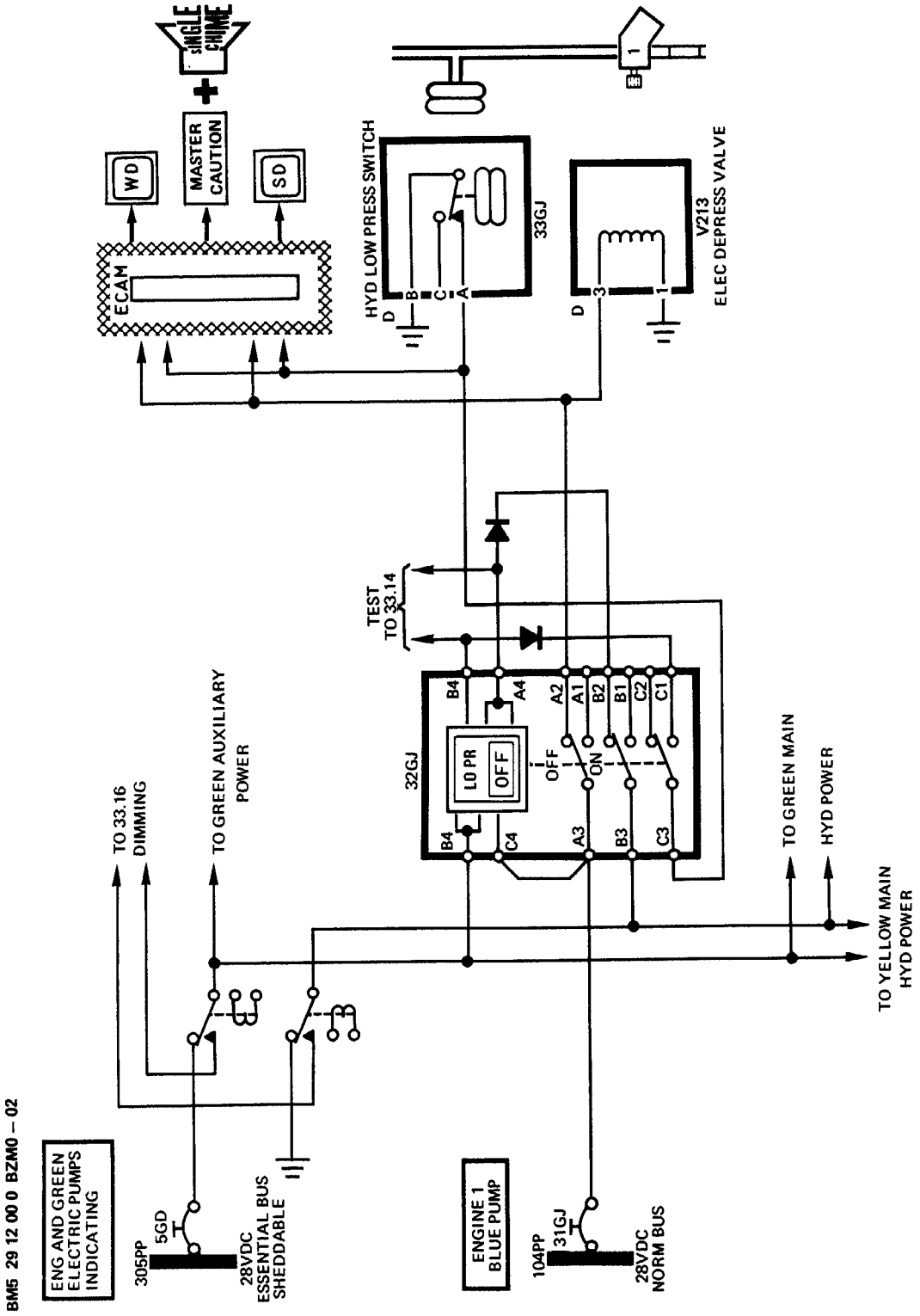
BM5 29 12 00 0 FAM0 02

Blue Hydraulic Power System
Figure 007



BM5 29 12 00 0 CAM0 01

Blue Pump Fire Valve Control
Figure 008



Blue Engine Pump Control and Monitoring
Figure 009

R MANIFOLD - HP, BLUE
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Caps/Plugs
(2)	Circuit Breaker(s) Safety Clip(s)
(3)	Container
(4)	Warning Notices
(5)	Access Platform 2.6 m (8 ft. 8 in.)
(6)	Lockwire
(7)97A29102090000	Bobbin and Ring Installation Tool
(8)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
(9)Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
R - 20-23-21, P. Block 1	Hydraulic Bobbins
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 27-84-00, P. Block 501	Hydraulic Activation and Power Transmission (SLATS)
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-11-55, P. Block 601	Pumps Delivery Relief Valve
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 29-22-11, P. Block 401	Green/Blue Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

2. Procedure

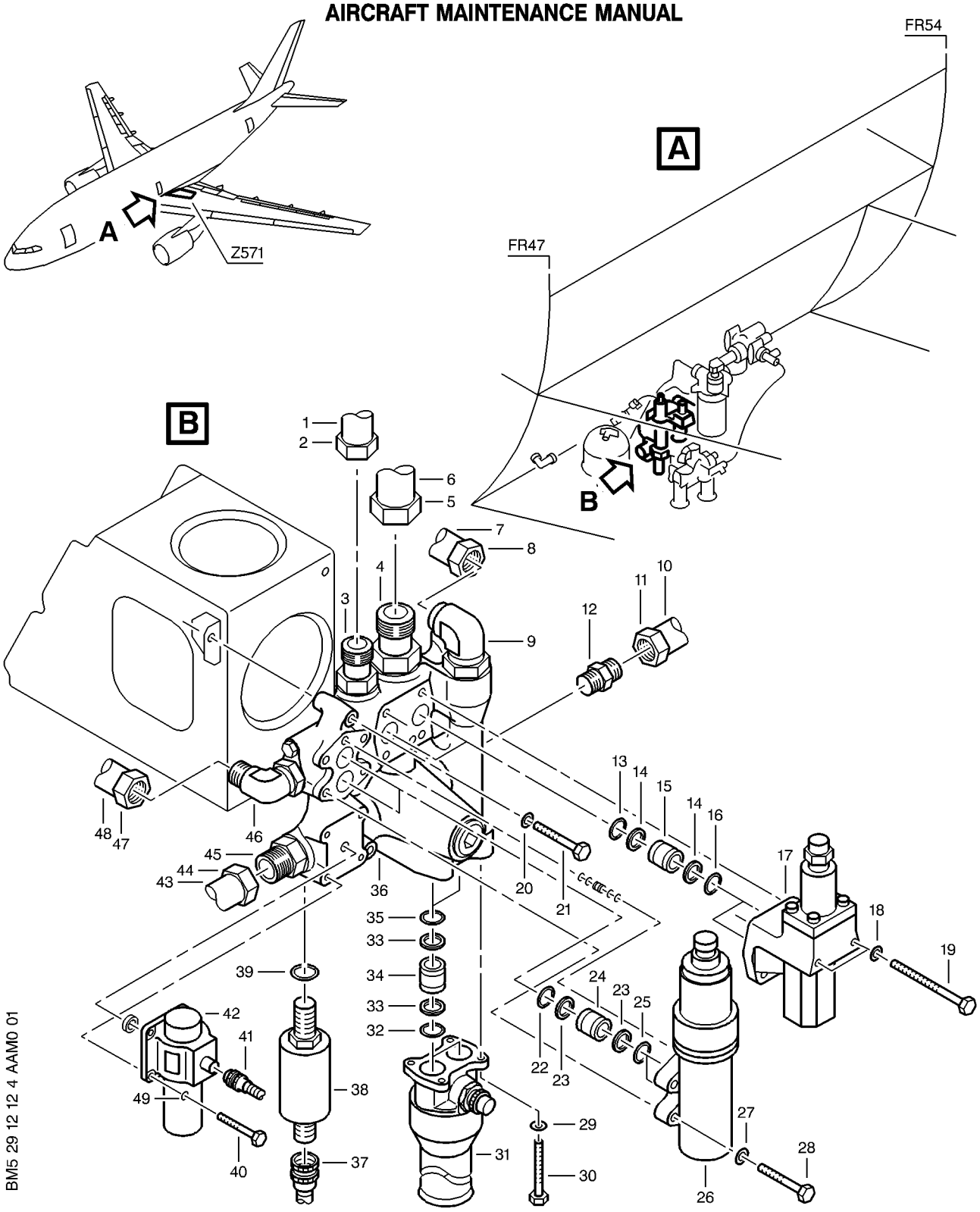
A. Job Set-Up
(1)On overhead panel 427VU in flight compartment :
(a)Make certain that Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).
(b)Display a warning notice prohibiting pressurization and use of Blue hydraulic system.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Install access platform at zone 140.
(6)Depressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(7)Depressurize Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Place container under reservoir to be drained and place absorbent material around unions.
(9)Drain Blue hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(10)Disconnect isolation coupling of Power Transfer Unit (PTU) (Ref. 29-22-11, P. Block 401).

B. Removal
(Ref. Fig. 401)
(1)Disconnect electrical connectors (37) (41).
(2)Put blanking caps on disconnected electrical connectors.
(3)Loosen pipe end-fitting (2) and disconnect pipe (1) from union (3).
(4)Loosen pipe end-fitting (5) and disconnect pipe (6) from union (4).
(5)Loosen pipe end-fitting (8) and disconnect pipe (7) from elbow union (9).
(6)Loosen pipe end-fitting (11) and disconnect pipe (10) from union (12).
(7)Loosen pipe end-fitting (44) and disconnect pipe (43) from union (45).
(8)Loosen pipe end-fitting (47) and disconnect pipe (48) from elbow union (46).
(9)Hold manifold (36) and remove bolts (21), washers (20). Remove manifold (36).
(10)Install blanking plugs on disconnected line ends and manifold ports.

C. Preparation of Replacement Component
CAUTION : WHEN REMOVING THE BOBBINS, GREAT CARE SHOULD BE TAKEN NOT TO DAMAGE THEM. IT IS RECOMMENDED TO USE SPECIAL TOOL 97A29102090000.
(1)Remove parts which are attached to removed HP manifold (36).
(a)Remove HP filter (31).
1 Cut, remove and discard lockwire.
2 Remove bolts (30), washers (29) and remove HP filter.
R 3 Remove and discard seals (35), packings (32) and O-rings (33) from
R bobbins (34) (Ref. 20-23-21, P. Block 1).
(b)Remove priority valve (26).
1 Cut, remove and discard lockwire.
2 Remove bolts (28), washers (27) and remove priority valve.
R 3 Remove and discard seals (22), packings (25) and O-rings (23) from
R bobbins (24) (Ref. 20-23-21, P. Block 1).
(c)Remove pressure switch (38) and retain packing (39).



Blue HP Manifold
Figure 401

R

(d)Remove relief valve assy (17).
1 Cut, remove and discard lockwire.
2 Remove bolts (19), washers (18) and remove relief valve assy.
R 3 Remove and discard seals (13), packings (16) and O-rings (14) from
R bobbins (15) (Ref. 20-23-21, P. Block 1).
(e)Remove hydraulic pressure transmitter (42).
1 Cut, remove and discard lockwire.
2 Remove bolts (40), washers (49) and remove hydraulic pressure transmitter.
(f)Put bobbins (15) (24) (34) into plastic bags to keep them clean.
(g)Install blanking plugs in the open ports of all removed components.
(h)Remove union (3) from manifold (36) and discard O-ring.
(j)Remove union (4) from manifold (36) and discard O-ring.
(k)Remove elbow union (9) from manifold (36) and discard O-ring.
(l)Remove union (12) from manifold (36) and discard O-ring.
(m)Remove union (45) from manifold (36) and discard O-ring.
(n)Remove elbow union (46) from manifold (36) and discard O-ring.
(2)Install removed parts on replacement manifold (36).
(Ref. Fig. 401)
(a)Remove blanking plugs from manifold (36) and components.
(b)Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.
(c)Put O-ring in position on union (3).
Install and tighten union (3) on manifold (36).
(d)Put O-ring in position on elbow union (4).
Install and tighten union (4).
(e)Put O-ring in position on elbow union (9).
Install and tighten elbow union (9).
(f)Put O-ring in position on union (12).
Install and tighten union (12).
(g)Put O-ring in position on elbow union (45).
Install and tighten elbow union (45).
(h)Put O-ring in position on elbow union (46).
Install and tighten elbow union (46).
NOTE : Make sure that you install the square-section seal on the end of the bobbin without the identification groove.
NOTE : Make sure that you install the bobbins so that the identification groove is in the manifold.
(j)Install HP filter (31).
R 1 Put new seals (35), packings (32) and O-rings (33) in position on
R bobbins (34).
R 2 Install bobbins (34) in ports of manifold (36) (Ref. 20-23-21,
R P. Block 1).
3 Install HP filter (31). Install bolts (30) and washers (29). Tighten bolts (30) and safety with lockwire.
(k)Install priority valve (26).
R 1 Put new seals (22), packings (25) and O-rings (23) in position on
R bobbins (24).
R 2 Install bobbins (24) in ports of manifold (36) (Ref. 20-23-21,
R P. Block 1).
3 Install priority valve (26). Install bolts (28) and washers (27). Tighten bolts (28) and safety with lockwire.

(l)Install packing (39) and connect pressure switch (38).
(m)Install hydraulic pressure transmitter (42). Install bolts (40) and washers (49). Tighten bolts (40) and safety with lockwire.
(n)Install relief valve assy (17).
R 1 Put new seals (13), packings (16) and O-rings (14) in position on
R bobbins (15).
R 2 Install bobbins (15) in ports of manifold (36) (Ref. 20-23-21,
R P. Block 1).
3 Install relief valve assy. Install bolts (19) and washers (18). Tighten bolts (19) and safety with lockwire.

D. Installation
(Ref. Fig. 401)
(1)Remove sealant from contact surface of manifold (36) and aircraft structure with a plastic or wooden scraper.
(2)Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.
(3)Put manifold (36) in position on aircraft.
(a)Install bolts (22) and washers (20).
(b)Install bolts (22). Tighten bolts (21) and safety with lockwire.
(4)Apply a layer of SEALANTS (Material No. 09-018) to contact surface of manifold.
(5)Remove blanking plugs from pipe connections.
(6)Connect pipe (48) to elbow union (46). Install pipe end-fitting (47).
(7)Connect pipe (7) to elbow union (9). Install pipe end-fitting (8).
(8)Connect pipe (1) to union (3). Install pipe end-fitting (2).
(9)Connect pipe (6) to union (4). Install pipe end-fitting (5).
(10)Connect pipe (10) to union (12). Install pipe end-fitting (11).
(11)Connect pipe (43) to union (45). Install pipe end-fitting (44).
(12)Connect electrical connectors (41) (37) to the receptacles on manifold (36).

E. Tests
(1)Remove safety clips and tags and close these circuit breakers : 1GQ, 1GR, 1GL, 6GL and 4GE.
(2)Make certain that fluid level in Blue hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Pressurize Blue hydraulic system reservoir (Ref. 29-14-00 P. Block 301).
(4)Visually check for hydraulic fluid leakage at the various line connections.
(5)Check for air leakage, using soapy water and direct reading pressure gage.
(6)Check that quantity transmitter direct reading gage and quantity indicator in flight compartment read same indication.
(7)Pressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(8)Check pumps delivery relief valve (30) (Ref. 29-11-55, P. Block 601).
(9)Carry out an operational test of the hydraulic actuation and power transmission (slats) (Ref. 27-84-00, P. Block 501).
(10)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).

F. Close-up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

RESERVOIR RETURN FILTER 292002 - SERVICING

Servicing procedure of Blue reservoir return filter 2002 is dealt with 29-11-15.

MANIFOLD - LP, BLUE
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Plugs
(2)	Circuit Breaker(s) Safety Clip(s)
(3)	Container
(4)	Warning Notices
(5)	Access Platform 2.6 m (8 ft. 8 in.)
(6)	Lockwire
(7)	Plastic or Wooden Scraper
(8)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
(9)Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 20-23-12, P. Block 1	Specified Torque Values for Unions
- 20-28-11, P. Block 1	Electrical Bonding
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 29-00-00, P. Block 301	General Servicing
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-22-11, P. Block 401	Green/Blue Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

2. Procedure

A. Job Set-Up
(1)On overhead panel 427VU in flight compartment :
(a)Make certain that Blue electric pump is not operating (ELEC PUMP pushbutton switch legend off).
(b)Display a warning notice prohibiting pressurization and use of Blue hydraulic system.
(2)Open, safety and tag the following circuit breakers :

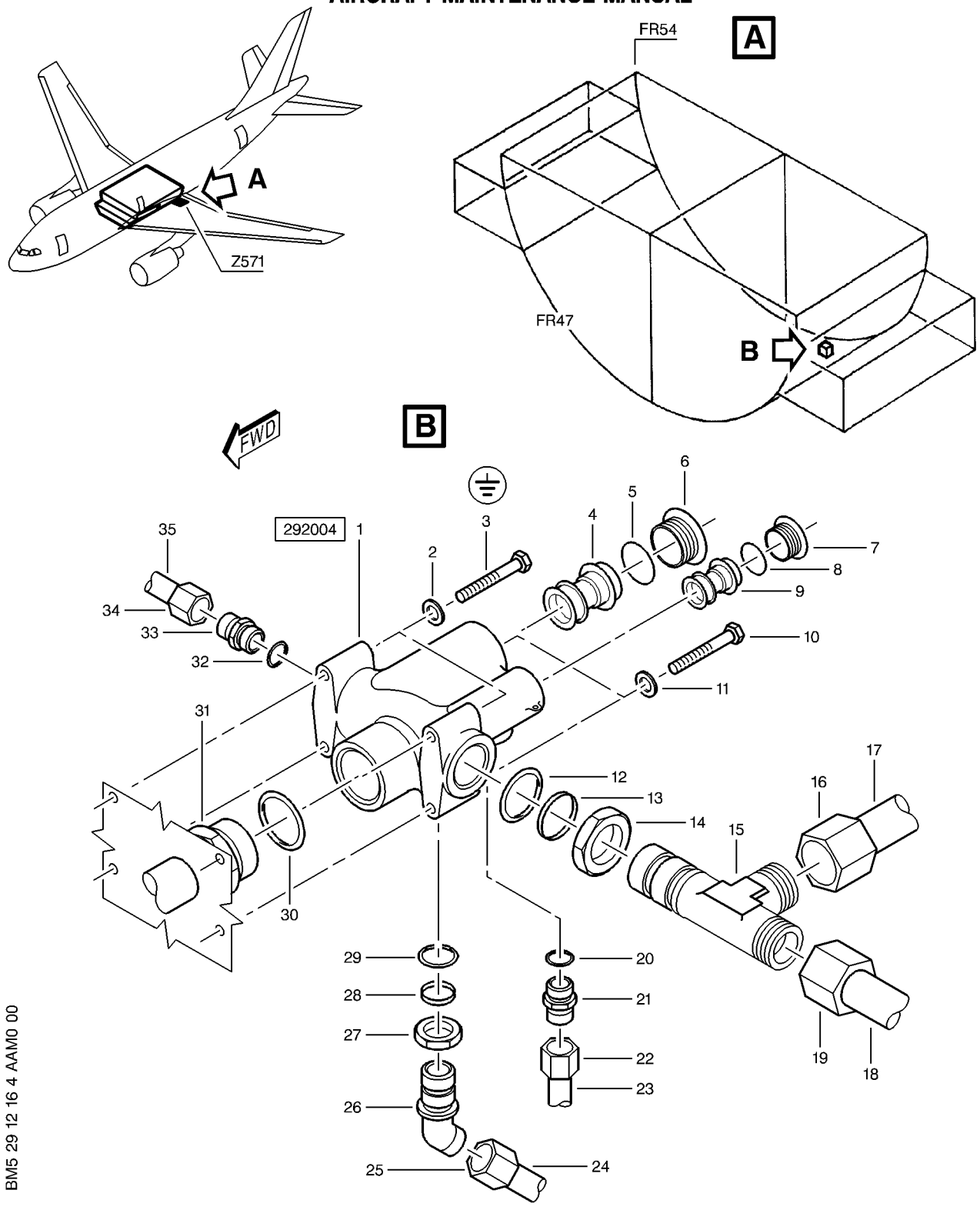
PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/B	1GL	332/U59
133VU	ELEC/PUMPS/WARN	4GE	801/V60

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Install access platform at zone 571.
(6)Depressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(7)Depressurize Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Place container under reservoir to be drained and place absorbent material around unions.
(9)Drain Blue hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(10)Disconnect isolation coupling from Power Transfer Unit (PTU) (Ref. 29-22-11, P. Block 401).

B. Removal
(Ref. Fig. 401)
(1)Loosen pipe end-fitting (16) and disconnect pipe (17) from tee union (15).
(2)Loosen pipe end-fitting (19) and disconnect pipe (18) from tee union (15).
(3)Loosen pipe end-fitting (22) and disconnect pipe (23) from union (21).
(4)Loosen pipe end-fitting (25) and disconnect pipe (24) from elbow union (26).
(5)Loosen pipe end-fitting (34) and disconnect pipe (35) from union (33).
(6)Remove bolts (3), (10) and washers (2) and (11).
(7)Loosen union nut (31) and remove manifold (1) from support plate.
(8)Remove and discard O-ring (30) from Blue LP-filter elbow union.
(9)Install blanking plugs on disconnected line ends.

C. Preparation of Replacement Component
(1)Remove parts which are attached to removed LP manifold (1).
NOTE : Put non-return valves, unions and plugs into plastic bags to keep them clean.
(a)Cut, remove and discard lockwire from manifold (1).
(b)Remove tee union (15) and nut (14) from manifold (1) and discard packings (12) and (13).
(c)Remove union (21) from manifold (1) and discard O-ring (20).
(d)Remove elbow union (26) and nut (27) from manifold (1) and discard packings (28) and (29).
(e)Remove union (33) from manifold (1) and discard O-ring (32).
(f)Remove extractor plug (6) from manifold (1) and discard O-ring (5).
(g)Remove non-return valve (4) from manifold (1).
(h)Remove extractor plug (7) from manifold (1) and discard O-ring (8).
(j)Remove non-return valve (9) from manifold (1).
(k)Install blanking plugs on manifold ports.
(2)Install removed parts on replacement manifold (1).
(Ref. Fig. 401).
(a)Remove blanking plugs from manifold (1).



BM5 29 12 16 4 AAM0 00

Blue LP Manifold
Figure 401

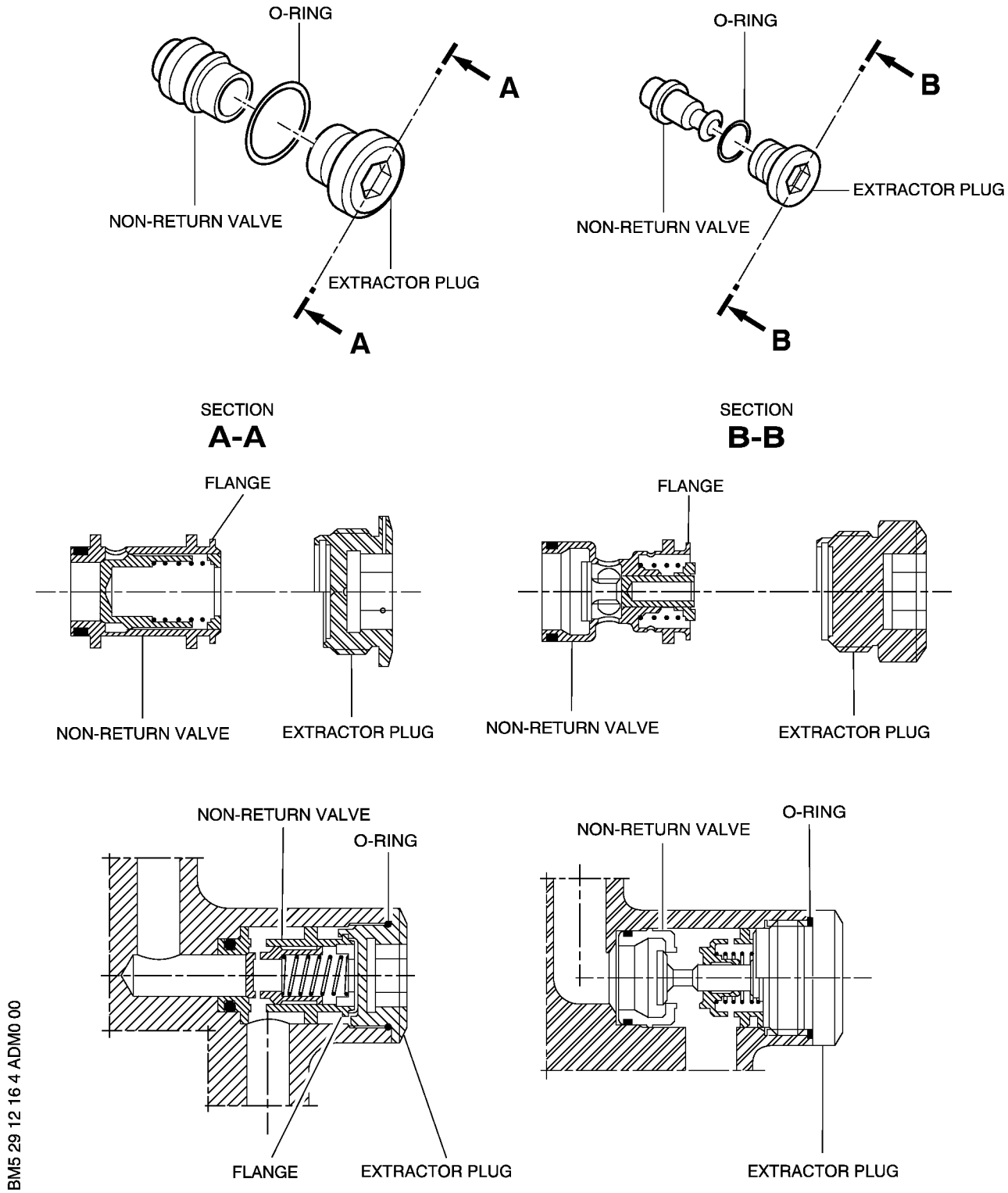
(b)Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.
(c)Put new packings (12) and (13) in position on tee union (15), install and tighten tee union (15) and nut (14) on manifold (1).
TORQUE tee union (15) and nut (14) to between 11.64 and 11.86 m.daN (1030 and 1050 lbf.in) (Ref. 20-23-12, P. Block 1).
(d)Put new O-ring (20) in position on union (21), install and tighten union (21) on manifold (1).
TORQUE union (21) to between 1.63 and 1.75 m.daN (144 and 155 lbf.in) (Ref. 20-23-12, P. Block 1).
(e)Put new packings (28) and (29) in position on elbow union (26), install and tighten elbow union (26) and nut (27) on manifold (1).
TORQUE elbow union (26) and nut (27) to between 7.29 and 7.40 m.daN (645 and 655 lbf.in) (Ref. 20-23-12, P. Block 1).
(f)Put new O-ring (32) in position on union (33), install and tighten union (33) on manifold (1).
TORQUE union (33) to between 1.63 and 1.75 m.daN (144 and 155 lbf.in) (Ref. 20-23-12, P. Block 1).
R (g)Installation of non-return valve (4).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE
R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-ring (5) in position on extractor plug (6).
R 2 Install extractor plug (6) on non-return valve (4).
R 3 Install non-return valve/extractor plug assembly on manifold (1).
R 4 TORQUE extractor plug (6) to between 9.7 and 10.7 m.daN (859 and 947 lbf.in.) (Ref. 20-23-12, P. Block 1).
R (h)Installation of non-return valve (9).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE
R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-ring (8) in position on extractor plug (7).
R 2 Install extractor plug (7) on non-return valve (9).
R 3 Install non-return valve/extractor plug assembly on manifold (1).
R 4 TORQUE extractor plug (7) to between 7.3 and 7.4 m.daN (645 and 655 lbf.in.) (Ref. 20-23-12, P. Block 1).
R (j)Safety non-return valves with lockwire.

D. Installation
(Ref. Fig. 401)
(1)Remove sealants from contact surface manifold (1) and aircraft structure with a plastic or wooden scraper.
(2)Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.
(3)Put new O-ring (30) in position on Blue LP-filter elbow union.
(4)Put manifold (1) in position on aircraft.
(5)Install bolts (3), (10) and washers (2) and (11).
Tighten bolts (3) and (10).
(6)Tighten and TORQUE union nut (31) to between 14.10 and 14.30 m.daN (1248 and 1266 lbf.in) (Ref. 20-23-12, P. Block 1).

(7)Apply a layer of SEALANTS (Material No. 09-018) to contact surface of manifold (1).
(8)Make certain that electrical bonding is correct (Ref. 20-28-11, P. Block 1).
(9)Remove blanking plugs from pipe connections.
(10)Connect pipe (17) to tee union (15), install and tighten pipe end-fitting (16).
TORQUE pipe end-fitting (16) to between 12.90 and 14.20 m.daN (1140 and 1260 lbf.in) (Ref. 20-23-12, P. Block 1).
(11)Connect pipe (18) to tee union (15), install and tighten pipe end-fitting (19).
TORQUE pipe end-fitting (19) to between 8.5 and 9.5 m.daN (752 and 841 lbf.in) (Ref. 20-23-12, P. Block 1).
(12)Connect pipe (23) to union (21), install and tighten pipe end-fitting (22).
TORQUE pipe end-fitting (22) to between 2.90 and 3.20 m.daN (257 and 283 lbf.in) (Ref. 20-23-12, P. Block 1).
(13)Connect pipe (24) to elbow union (26), install and tighten pipe end-fitting (25).
TORQUE pipe end-fitting (25) to between 7.5 and 8.3 m.daN (664 and 735 lbf.in) (Ref. 20-23-12, P. Block 1).
(14)Connect pipe (35) to union (33), install and tighten pipe end-fitting (34).
TORQUE pipe end-fitting (34) to between 2.90 and 3.20 m.daN (257 and 283 lbf.in) (Ref. 20-23-12, P. Block 1).

E. Tests
(1)Remove safety clips and tags and close these circuit breakers : 1GQ, 1GR, 1GL and 4GE.
(2)Make certain that fluid level in Blue hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Pressurize Blue hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Visually check for hydraulic fluid leakage at the various line connections.
(5)Check for air leakage, using soapy water and direct-reading pressure gage.
(6)Check that quantity transmitter direct-reading gage and quantity indicator in flight compartment read same indication.
(7)Pressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).

F. Close-up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Typical Non-Return Valve and Extractor Plug Installation
Figure 402

R

VALVE-DEPRESSURIZATION/RELIEF (292005) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Blanking Plugs
C.	Circuit Breaker Safety Clips
D.	Warning Notices
E. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Reservoir Replenishing
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)On panel 427VU,
- display a warning notice prohibiting pressurization and use of Blue hydraulic system.

(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B 8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL&/CARGO DOOR/PUMP	7GX	333/T51

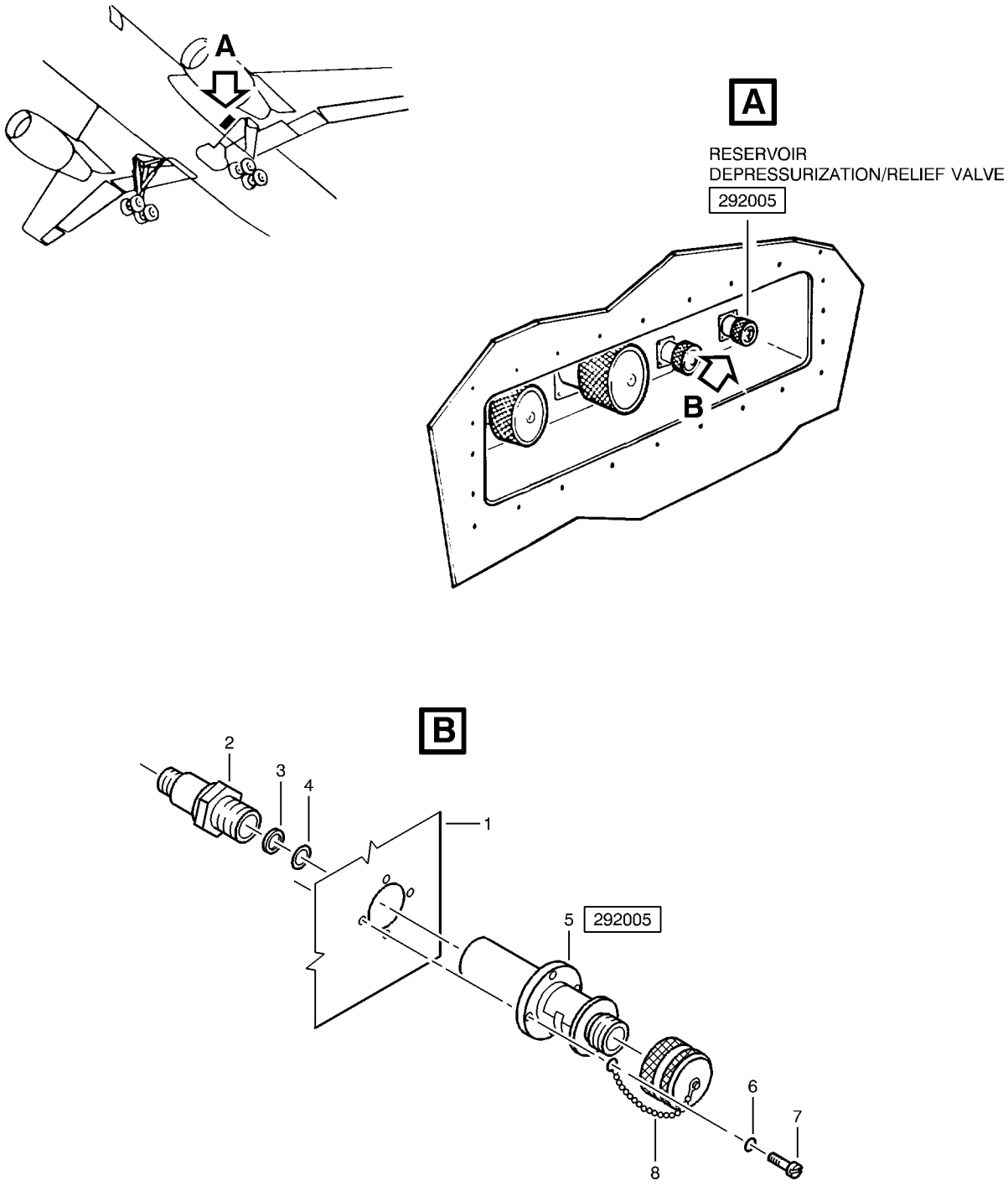
(3)Install access platform at zone 571.
(4)Open access door 571DB.
(5)Display a warning notice on ground connector prohibiting pressurization and use of Blue hydraulic system.
(6)Open main gear doors (Ref. 32-12-11, P. Block 301).
(7)Depressurize Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Depressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).

B. Removal
(1)Disconnect line from union (2) from inner side of aircraft structure (1).
(2)Put blanking plug on disconnected line end.
(3)Remove three screws (7) and washers (6).
(4)Remove valve (5).
(5)Remove union (2) and discard packing (4) and packing washer (3).
(6)Put blanking plug in port of valve (5).

C. Preparation of Replacement Component
(1)Make certain that the parts retained from the removed component are clean and in correct condition.
(2)Remove blanking plug from port of valve (5).
(3)Install a new packing (4) and a new packing washer (3) on union (2) and install union (2) in port of valve (5).

D. Installation
(1)Clean and inspect component interface and/or component adjacent area.
(2)Remove plug from disconnected line end.
(3)Install valve (5).
NOTE : Do not forget to attach chain (8) when installing washers (6) and screws (7).
(4)Install washers (6) and screws (7) and tighten.
(5)Apply Hydraulic Fluid (Material No. 02-003) to union (2) threads.
(6)Connect line to union (2).

E. Test



Blue Reservoir Depressurization/Relief Valve
Figure 401

(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 1GL, 6GL and 7GX.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics rack ventilation is correct.
(3)Pressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Pressurize Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(5)Check for leakage at valve (5) using soapy water.
(6)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door.
(3)Close main gear doors (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

Removal/Installation of Blue engine pump 2030 is dealt with in topic 29-11-32,P. Block 401.

MANIFOLD - SERVO CONTROLS, B
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F.	Lockwire
G.	Plastic or Wooden Scraper
H. 97A29102090000	Bobbin and Ring Installation Tool
J. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
K. Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 20-23-21, P. Block 1	Hydraulic Bobbins
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 27-14-11, P. Block 401	Selector Valve - Servo Controls
- 27-14-18, P. Block 401	Pressure Switch - Servo Controls
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (SLATS)
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 29-22-11, P. Block 401	Green/Blue Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

2. Procedure

A. Job Set-Up
(1)On overhead panel 427VU in flight compartment :
(a)Make certain that Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).
(b)Display a warning notice prohibiting pressurization and use of Green

hydraulic system.

(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Install access platform at zone 140.
(6)Depressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(7)Depressurize Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Place container under reservoir to be drained and place absorbent material around unions.
(9)Drain Blue hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(10)Disconnect isolation coupling of Power Transfer Unit (PTU) (Ref. 29-22-11, P. Block 401).
(11)Remove selector valve (Ref. 27-14-11, P. Block 401).
(12)Remove pressure switch (Ref. 27-14-18, P. Block 401).

B. Removal

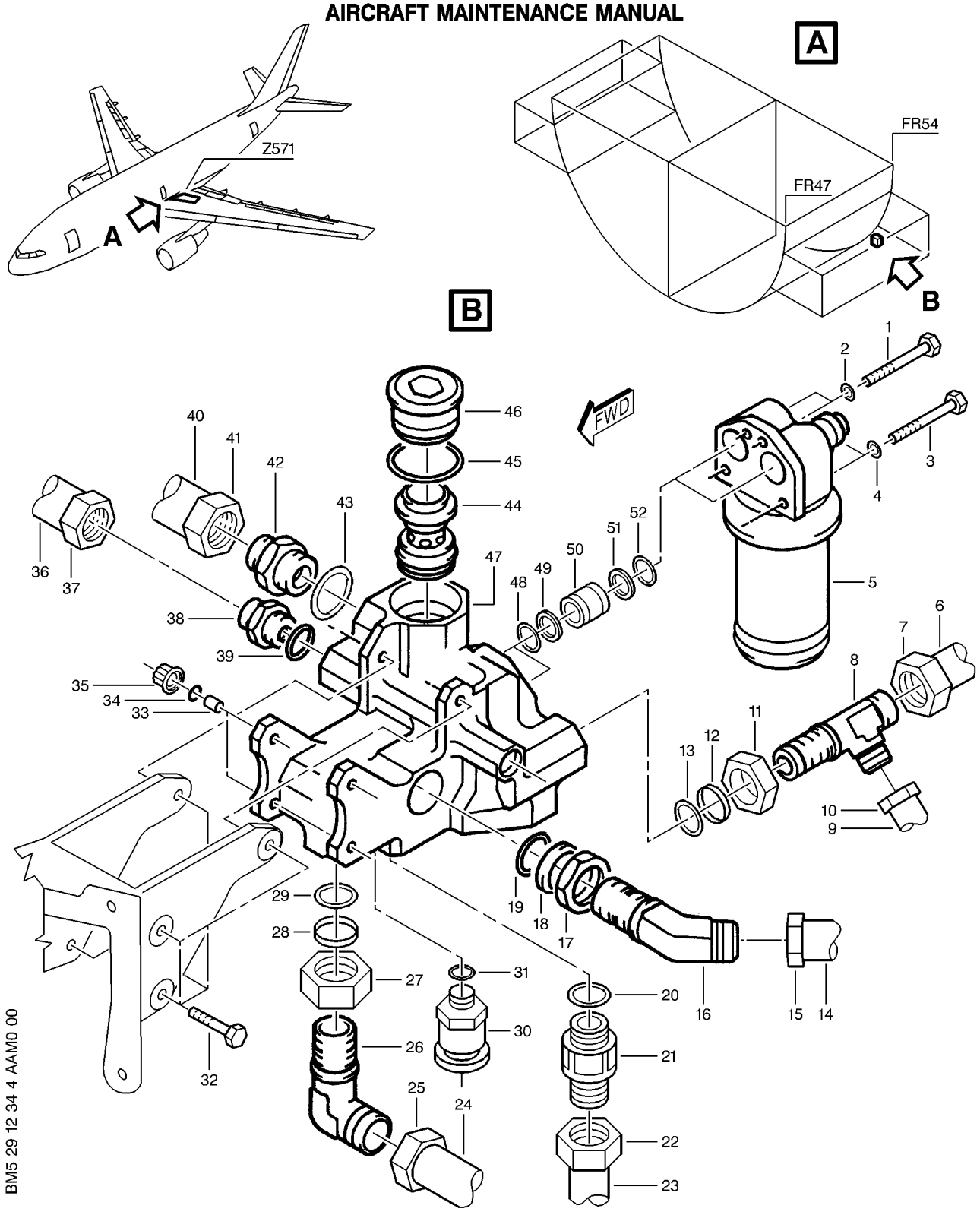
R (Ref. Fig. 401)

(1)Loosen pipe end-fitting (7) and disconnect pipe (6) from tee union (8).
(2)Loosen pipe end-fitting (10) and disconnect pipe (9) from tee union (8).
(3)Loosen pipe end-fitting (15) and disconnect pipe (14) from elbow union (16).
(4)Loosen pipe end-fitting (22) and disconnect pipe (23) from valve (21).
(5)Loosen pipe end-fitting (25) and disconnect pipe (24) from elbow union (26).
(6)Loosen pipe end-fitting (37) and disconnect pipe (36) from union (38).
(7)Loosen pipe end-fitting (41) and disconnect pipe (40) from union (42).
(8)Hold manifold (47) and remove bolts (32), bushings (33), washers (34) and nuts (35). Remove manifold (47).
(9)Install blanking plugs on disconnected line ends and manifold ports.

C. Preparation of Replacement Component

CAUTION : WHEN REMOVING THE BOBBINS, GREAT CARE SHOULD BE TAKEN NOT TO DAMAGE THEM. IT IS RECOMMENDED TO USE SPECIAL TOOL 97A29102090000.

(1)Remove parts which are attached to removed manifold (47).
(a)Remove filter (5).
1 Cut, remove and discard lockwire.
2 Remove bolts (1) and (3), washers (2) and (4) remove filter (5).
3 Remove and discard seals (52), packings (48) and O-rings (49) and (51) from bobbins (50) (Ref. 20-23-21, P. Block 1).



B Servo Controls Manifold

R Figure 401

(b)Put bobbins (50) into plastic bags to keep them clean.
(c)Install blanking plugs in open ports of all removed components.
(d)Remove elbow union (16) and nut (17) from manifold (47) and discard packings (18) and (19).
(e)Remove elbow union (26) and nut (27) from manifold (47) and discard packings (28) and (29).
(f)Remove tee union (8) and nut (11) from manifold (47) and discard packings (12) and (13).
(g)Remove union (38) from manifold (47) and discard packing (39).
(h)Remove union (42) from manifold (47) and discard packing (43).
(j)Remove cap (46) and valve (44) from manifold (47) and discard packing (45).
(k)Remove valve (30) from manifold (47) and discard packing (31).
(l)Remove valve (21) from manifold (47) and discard packing (20).

(2)Install removed parts on replacement manifold (47).
(Ref. Fig. 401).
(a)Remove blanking plugs from manifold (47) and components.
(b)Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.
(c)Put new packings (12) and (13) in position on tee union (8). Install tee union (8) and tighten nut (11) on manifold (47).
(d)Put new packings (18) and (19) in position on elbow union (16). Install elbow union (16) and tighten nut (17) on manifold (47).
(e)Put new packings (28) and (29) in position on elbow union (26). Install elbow union (26) and tighten nut (27) on manifold (47).
(f)Put new packing (39) in position on union (38). Install and tighten union (38) on manifold (47).
(g)Put new packing (43) in position on union (42). Install and tighten union (42) on manifold (47).

NOTE : Make sure that you install the square-section seal on the end of the bobbins without the identification groove.

NOTE : Make sure that you install the bobbins so that the identification groove is in the manifold.

(h)Install filter (5).
1 Put new seals (52), packings (48) and O-rings (49) and (51) in position on bobbins (50).
2 Install bobbins (50) in ports of manifold (47) (Ref. 20-23-21, P. Block 1).
3 Install filter (5). Install bolts (1) and (3) and washers (2) and (4). Tighten bolts (1) and (3) and safety with lockwire.

R (j)Installation of non-return valve (44).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE
R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-ring (45) in position on extractor plug (46).
R 2 Install extractor plug (46) on non-return valve (44).
R 3 Install non-return valve/extractor plug assembly on manifold (47).
R 4 TORQUE extractor plug (46) to between 9.7 and 10.7 m.daN (859 and
R 947 lbf.in.) (Ref. 20-23-12, P. Block 1).

(k)Put new packing (31) on fluid sampling valve (30). Install and tighten valve (30) on manifold (47).

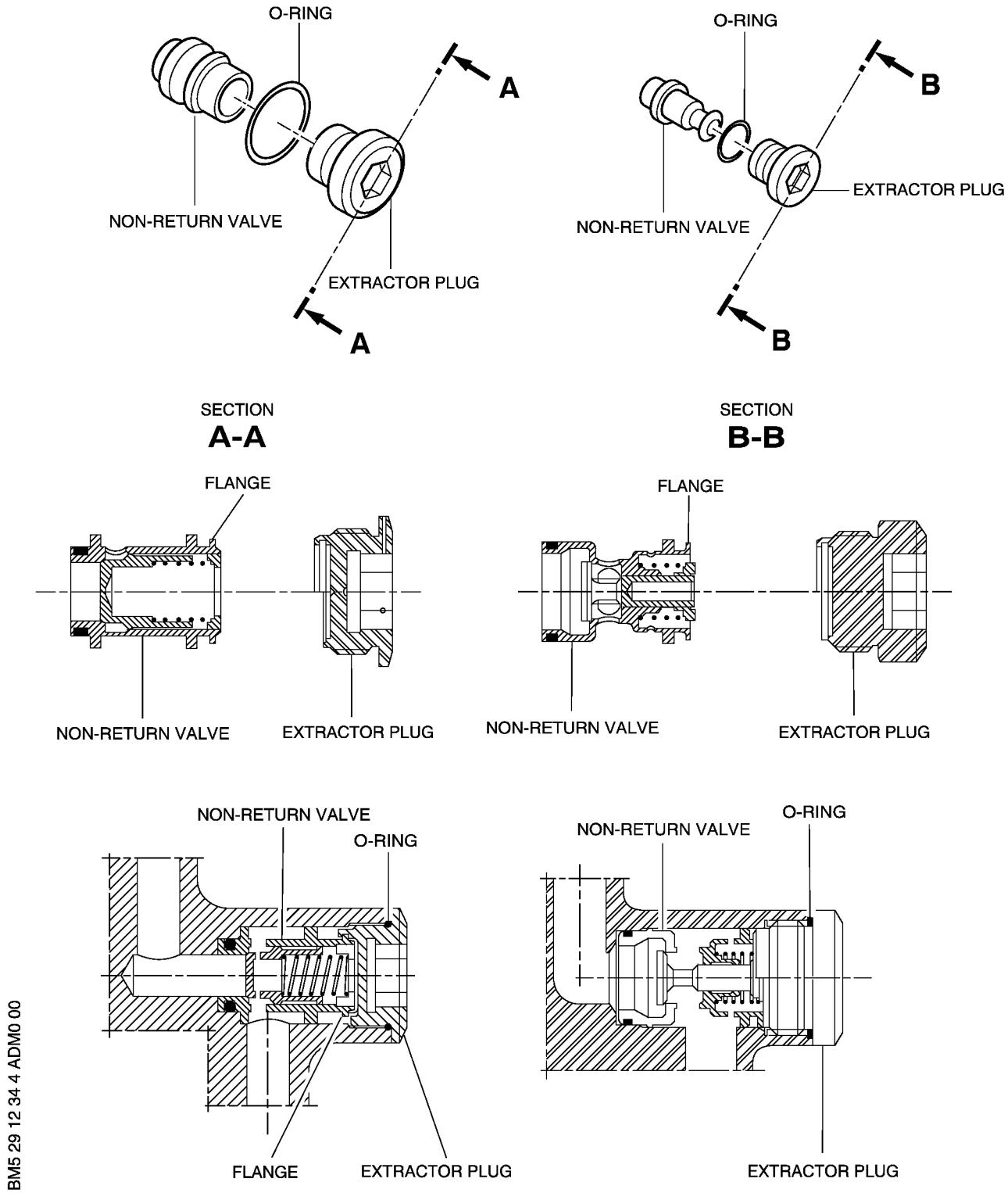
(l)Put new packing (20) on valve (21). Install and tighten valve (21) on manifold (47).

D. Installation
(Ref. Fig. 401)
(1)Remove sealant from contact surface of manifold (47) and aircraft structure with a plastic or wooden scraper.
(2)Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.
(3)Put manifold (47) in position on aircraft.
(a)Install bolts (32), bushings (33), washers (34) and nuts (35).
(b)Tighten nuts (35) and safety with lockwire.
(4)Apply a layer of SEALANTS (Material No. 09-018) to contact surface of manifold (47).
(5)Remove blanking plugs from pipe connections.
(6)Connect pipe (6) to tee union (8). Tighten pipe end-fitting (7).
(7)Connect pipe (9) to tee union (8). Tighten pipe end-fitting (10).
(8)Connect pipe (14) to elbow union (16). Tighten pipe end-fitting (15).
(9)Connect pipe (24) to elbow union (26). Tighten pipe end-fitting (25).
(10)Connect pipe (36) to union (38). Tighten pipe end-fitting (37).
(11)Connect pipe (40) to union (42). Tighten pipe end-fitting (41).
(12)Connect pipe (23) to valve (21). Tighten pipe end-fitting (22).
(13)Install pressure switch (Ref. 27-14-18, P. Block 401).
(14)Install selector valve (Ref. 27-14-11, P. Block 401).

E. Tests
(1)Remove safety clips and tags and close these circuit breakers : 1CB, 2CB, 1GQ, 1GR, 1GL, 6GL and 4GE.
(2)Make certain that fluid level in Blue hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Pressurize Blue hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Bleed the Blue hydraulic system (Ref. 29-00-00, P. Block 401).
(5)Visually check for hydraulic fluid leakage at the various line connections.
(6)Check for air leakage, using soapy water and direct reading pressure gage.
(7)Check that quantity transmitter direct reading gage and quantity indicator in flight compartment read same indication.
(8)Pressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(9)Carry out an operational test of the hydraulic actuation and power transmission (slats) (Ref. 27-84-00, P. Block 501).
(10)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).
(11)Carry out an operational test of the servo control selector valve (Ref. 27-14-11, P. Block 401).
(12)Carry out an operational test of the servo control pressure switch (Ref. 27-14-18, P. Block 401).

F. Close-up
(1)Remove container and absorbent material.

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Remove access platform.
(5)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Typical Non-Return Valve and Extractor Plug Installation
Figure 402

R

RESERVOIR 292000 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN HAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Safety Barriers
B.	Warning Notices
C.	Hydraulic Fluid Containers
D.	Access Platform, 2.6 m (8 ft. 6 in.)
E.	Corrosion - Resistant Steel Lockwire, Dia. 0.8 mm (0.032 in.)
F. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00, P. Block 1)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

2. Procedure of Removal/Installation of Reservoir

A. Job Set-Up
(1)On overhead panel 427VU in flight compartment :
(a)Display a warning notice prohibiting pressurization and use of Blue hydraulic system.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(3)Install acces platform at zone 571.
(4)Open access doors 571DB and 571BB.
(5)Depressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(6)Depressurize Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(7)Place container under reservoir to be drained and place absorbent

material around unions.
(8)Drain Blue hydraulic reservoir (Ref. 29-00-00, P. Block 301).

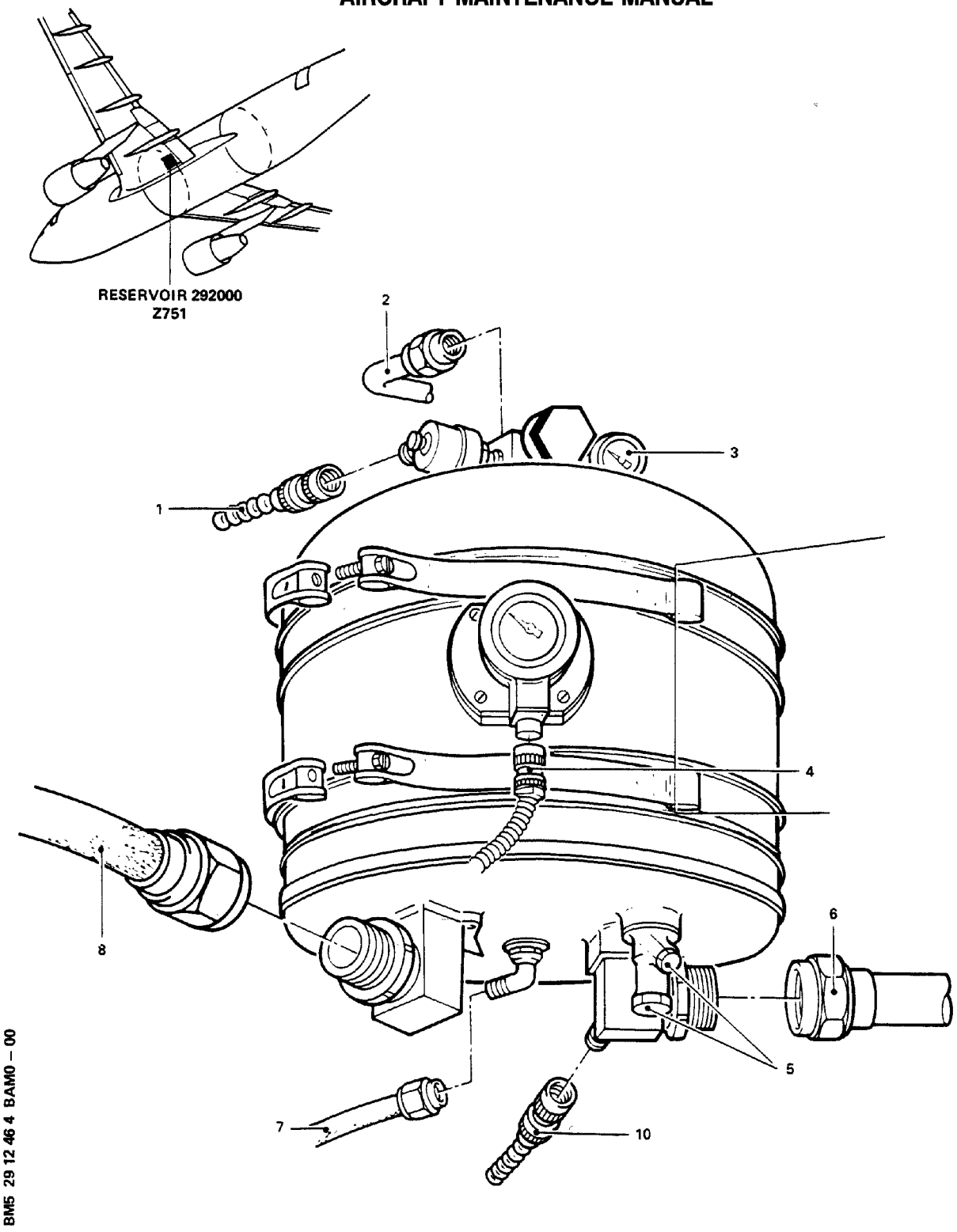
B. Removal
(Ref. Fig. 401)
(1)Disconnect electrical connectors (1), (4) and (10).
(2)Disconnect the following lines : engine pump suction (8), reservoir depressurization/relief (7), reservoir pressurization (2) and return (6).
(3)Plug/cap reservoir ports and open line ends.
(4)Remove bonding strip.
(5)Cut and remove lockwire and loosen clamp screws of both straps.
(6)Remove reservoir.

C. Preparation of Replacement Component
WARNING : THE REPLACEMENT RESERVOIR IS EQUIPPED WITH ITS CONNECTIONS, ATTACHING SCREWS INSTALLED BUT NOT TIGHTENED.
(1)Check that reservoir to be installed has not sustained any deterioration due to impacts or/and distortion and that paintwork is free from any scratches. Check that pressure and quantity gage glasses are in good condition.
(2)Remove blanking plugs/caps and lubricate union threads with Material No.02-003 (Ref. 20-31-00, P. Block 1).

D. Installation
(1)Position reservoir in its cradle
(2)Install the two straps. Do not tighten straps.
(3)Connect the following lines : reservoir return (6), reservoir depressurization/relief (7), reservoir pressurization (2) and engine pump suction (8).
(4)TORQUE the screws of the replacement reservoir connections to 0.5 m.daN (3.7 lbf. ft.). Wirelock.
(5)Connect electrical connectors (1), (4) and (10).
(6)Install bonding strip
(7)Tighten reservoir attaching straps and wirelock clamp nuts.

E. Tests
(1)Remove safety clips and tags and close circuit breakers 1GQ, 1GR, 1GL, 6GL and 4GE.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics rack ventilation is correct.
(3)Pressurize reservoir (Ref. 29-14-00, P. Block 301).
(4)Fill reservoir (Ref. 12-12-29, P. Block 1).
(5)Make certain that drain valve plugs (5) are wirelocked.
(6)Visually check for leakage of hydraulic fluid at the various line connections.
(7)Check for leakage of air, using soapy water and direct reading pressure gage (3).
(8)Check that quantity transmitter direct reading gage and quantity indicator in flight compartment read same indication.

F. Close-Up



Blue Hydraulic Reservoir
Figure 401

(1)Remove container and absorbent material
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices
(4)Close access doors.
(5)Remove access platform.
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. Procedure of Removal/Installation of Pressure Switch
Refer to 29-11-11, P. Block 401.

4. Procedure of Removal/Installation of Check Valve
Refer to 29-11-11, P. Block 401.

PUMP DELIVERY FILTER-292048 - SERVICING

Servicing procedure of Blue pump delivery filter 2048, is dealt with in 29-11-42, P. Block 301.

PUMP DELIVERY RELIEF VALVE 292063 - REMOVAL/INSTALLATION

Removal/Installation of pump delivery relief valve 2063 is dealt with in topic 29-11-55, P. Block 401.

Removal/Installation of Blue accumulator 2070 is dealt with in topic 29-11-56, P. Block 401.

ENGINE PUMP PRESSURE SWITCH 33GJ (6GD) REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Plug
(2)	Circuit Breaker Safety Clip
(3)	Container
(4)	Warning Notice
(5)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
(6)	Lockwire, Corrosion Resistant Steel, Dia. 06 mm (0.025 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurization System
- 71-00-00, P. Block 501	Power Plant

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers associated with engine pump pressure switch to be removed.

(a)Engine pump pressure switch 33GJ

PANEL	SERVICE	IDENT.	LOCATION
	Engine 1 Blue Pump		
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG/1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	PTU CTL/G/B	1GL	332/U59

(b)Engine pump pressure switch 6GD

PANEL	SERVICE	IDENT.	LOCATION
	Engine 2 Yellow Pump		
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/Y	6GL	332/U60

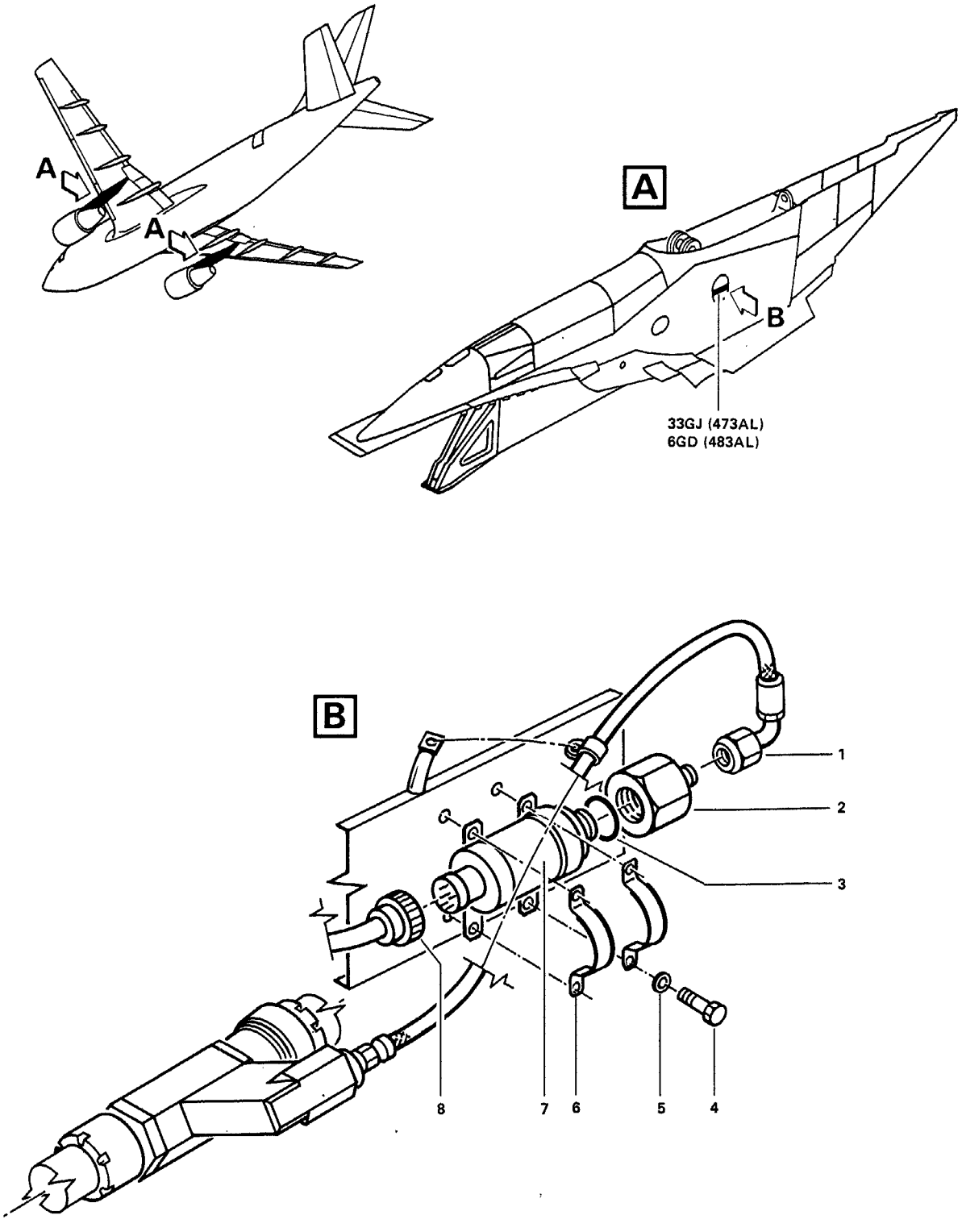
(2)Depressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Depressurize associated system reservoir (Ref. 29-14-00, P. Block 301).
(4)Display a warning notice on panel 472VU prohibiting operation of the system associated with engine pump pressure switch to be removed.
(5)Open access door 473AL (483AL).
(6)Place container under engine pump pressure switch to be removed.

B. Removal
(Ref. Fig. 401)
(1)Cut and remove lockwire and disconnect electrical connector (8).
(2)Disconnect hydraulic line (1) from reducer union (2).
Install blanking plug/cap on line (1).
(3)Remove screws (4) and retain washers (5). Remove clamps (6).
(4)Remove pressure switch (7).

C. Preparation of Replacement Component
(1)Remove reducer union (2) from pressure switch (7) and discard packing (3).
(2)Lubricate packing (3) with hydraulic fluid, Mat. No. 02-003.
(3)Install new packing and install reducer union (2) on replacement component. TORQUE to between 30.2 and 38.3 lbf.ft. (4.1 and 5.2 m.daN).

D. Installation
(1)Position pressure switch (7). Install clamps (6) equipped with washers (5) and install attachment screws (4).
(2)Connect hydraulic line (1) to reducer union (2).
TORQUE to between 11 and 12.5 lbf.ft. (1.5 and 1.7 m.daN).
(3)Connect and wirelock electrical connector (8).

E. Test
(1)Remove safety clips and tags and close circuit breakers 5GD, 31GJ, 101GK, 1GL or 1GD, 5GD, 103GK, 6GL.
(2)Pressurize associated system reservoir (Ref. 29-14-00, P. Block 301).
(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.
(4)On ECAM control panel, press HYD pushbutton switch and on panel 427VU, make certain that corresponding ENG PUMP pushbutton switch is pressed (in).
(5)Dry-motor the engine (Ref. 71-00-00, P. Block 501).
(6)Check pressure switch union for leakage.
(7)On panel 427VU, check that LO PR legend goes off as soon as pressure is higher than 2200 psi (152 bars).
(8)Stop dry-motoring engine.



Pressure Switch
Figure 401

(9)On panel 427VU, check that LO PR legend comes on as soon as pressure is lower than 1800 psi (124 bars).
(10)Check level of hydraulic fluid in reservoir and top-up if required (Ref. 12-12-29, P. Block 1).

F. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Remove container.
(3)Close access door.
(4)Remove warning notice.

GROUND CONNECTOR - SELF SEALING, B
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. B Suction Self-Sealing Ground Connector

A. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F.	Lockwire
G.	Plastic or Wooden Scraper
H. 97A29102090000	Bobbin and Ring Installation Tool
J. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
K. Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

B. Procedure

(1)Job set-up.

(a)On overhead panel 427VU in the flight compartment :

1 Make certain that the Blue electric pump is not operating (ELEC PUMP pushbutton switch legend off).

2 Make sure that the PTU G/B pushbutton switch is released (ON legend off).

3 Display a warning notice prohibiting pressurization and use of the Blue hydraulic system.

(b)Open, safety and tag the following circuit breakers :

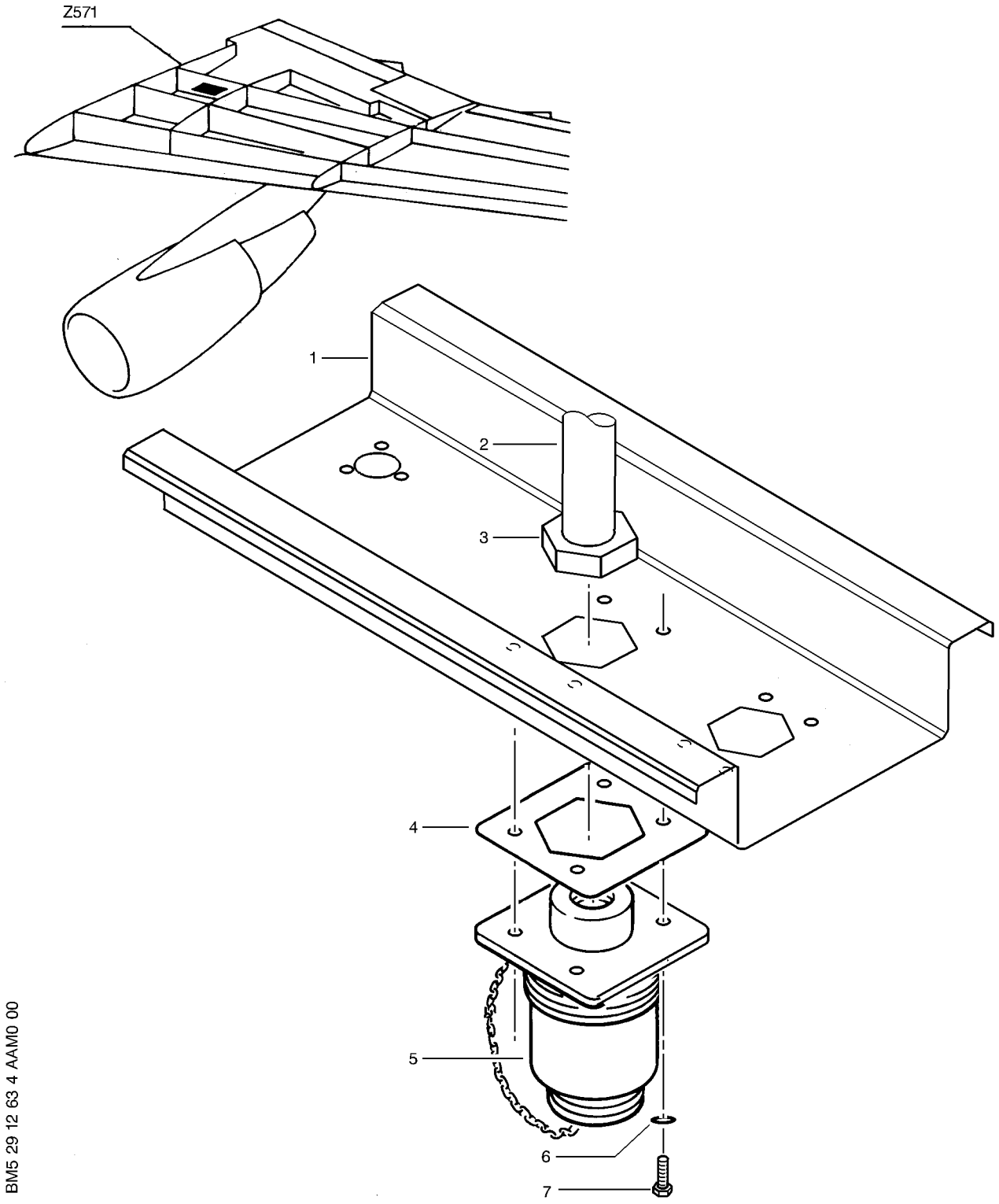
PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Open the main landing gear doors (Ref. 32-12-11, P. Block 301).
(e)Install an access platform at zone 571.
(f)Depressurize the Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(g)Depressurize the Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(h)Install a container and absorbent material under the Blue hydraulic reservoir and around the ground connector.
(j)Drain the Blue hydraulic reservoir (Ref. 29-00-00, P. Block 301).

(2)Removal.
(Ref. Fig. 401)
(a)Loosen the pipe end fitting (3) and disconnect the pipe (2) from the Blue suction ground connector (5).
(b)Hold the connector (5) and remove the bolts (7) and washers (6).
(c)Remove the connector (5) from the Blue ground service panel (1).
(d)Remove and discard the packing (4) from the connector (5).
(e)Install blanking plugs on the disconnected line ends and connector port.

(3)Installation.
(a)Examine the structure of aircraft in the connector attachment area for cracks, corrosion or other damage.
(b)Remove the blanking plugs from the disconnected line ends and connector port.
(c)Apply HYDRAULIC FLUIDS (Material No. 02-003) to threads of connector (5).
(d)Install a new packing (4) on the connector (5).
(e)Put and hold the connector (5) in position on the Blue ground service panel (1).
(f)Install the bolts (7) and washers (6) and TORQUE the bolts (7) to between 0.83 and 0.94 m.daN (73.45 and 83.18 lbf.in.).
(g)Connect the pipe (2) and TORQUE the pipe end fitting (3) to between 9.7 and 10.7 m.daN (71.53 and 78.90 lbf.ft).

(4)Tests.
(a)Remove safety clips and tags and close these circuit breakers : 1CB, 2CB, 1GQ, 1GR, 1GL, 6GL and 4GE.
(b)Make certain that the fluid level in the Blue hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(c)Pressurize the Blue hydraulic system reservoir (Ref. 29-14-00, P. Block 301).



B Suction Self-Sealing Ground Connector
Figure 401

(d)Bleed the Blue hydraulic system (Ref. 29-00-00, P. Block 401).
(e)Visually check for hydraulic fluid leakage at the various line connections.
(f)Check for air leakage, using soapy water and direct reading pressure gage.
(g)Check that the quantity transmitter direct reading gage and the quantity indicator in the flight compartment give the same indication.
(h)Pressurize the Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(j)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).

(5)Close-up.
(a)Remove the container and absorbent material.
(b)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(c)Remove the warning notices.
(d)Remove the access platform.
(e)Close the main landing gear doors (Ref. 32-12-11, P. Block 301).
(f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. B Delivery Self-Sealing Ground Connector

A. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 24-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (SLATS)
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 29-22-11, P. Block 401	Green/Blue Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

B. Procedure

(1)Job set-up.
(a)On overhead panel 427VU in the flight compartment :
1 Make certain that the Blue electric pump is not operating (ELEC

PUMP pushbutton switch legend off).
2 Make sure that the PTU G/B pushbutton switches are released (ON legend off).
3 Display a warning notice prohibiting pressurization and use of the Blue hydraulic system.

(b)Open, safety and tag the following circuit breakers :

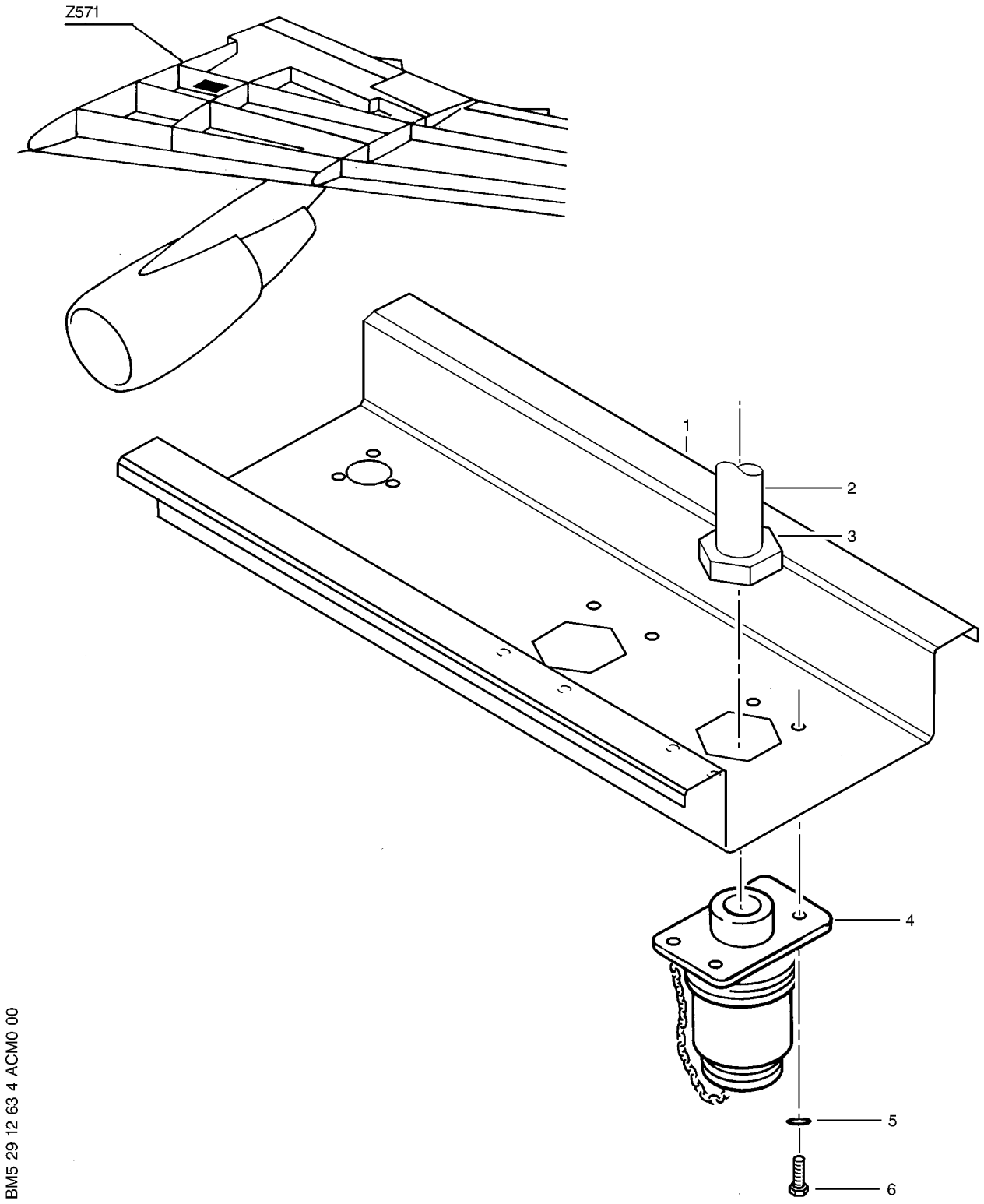
PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Open the main landing gear doors (Ref. 32-12-11, P. Block 301).
(e)Install an access platform at zone 571.
(f)Depressurize the Blue hydraulic system (Ref. 29-10-00, P. Block 301).
(g)Depressurize the Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(h)Install a container and absorbent material under the Blue hydraulic reservoir and around the ground connector.
(j)Drain the Blue hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(k)Disconnect the isolation coupling from Power Transfer Unit (PTU) (Ref. 29-22-11, P. Block 401).

(2)Removal.
(Ref. Fig. 402)
(a)Loosen the pipe end fitting (3) and disconnect the pipe (2) from the Blue delivery ground connector (4).
(b)Hold the connector (4) and remove the bolts (6) and washers (5).
(c)Remove the connector (4) from the Blue ground service panel (1).
(d)Install blanking plugs on the disconnected line ends and connector port.

(3)Installation.
(a)Examine the structure of aircraft in the connector attachment area for cracks, corrosion or other damage.
(b)Remove the blanking plugs from the disconnected line ends and connector port.
(c)Apply HYDRAULIC FLUIDS (Material No. 02-003) to the threads of the connector (4).
(d)Put and hold the connector (4) in position on the Blue ground service panel (1).
(e)Install the bolts (6) and washers (5) and TORQUE the bolts (6) to between 0.83 and 0.94 m.daN (73.45 and 83.18 lbf.in.).
(f)Connect the pipe (2) and TORQUE the pipe end fitting (3) to between 9.7 and 10.7 m.daN (71.53 and 78.90 lbf.ft).

(4)Tests.
(a)Remove the safety clips and tags and close these circuit breakers :



BM5 29 12 63 4 ACM0 00

B Delivery Self-Sealing Ground Connector
Figure 402

1CB, 2CB, 1GQ, 1GR, 1GL, 6GL and 4GE.

(b)Make certain that the fluid level in the Blue hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).

(c)Pressurize the Blue hydraulic system reservoir (Ref. 29-14-00, P. Block 301).

(d)Bleed the Blue hydraulic system (Ref. 29-00-00, P. Block 401).

(e)Visually check for hydraulic fluid leakage at the various line connections.

(f)Check for air leakage, using soapy water and direct reading pressure gage.

(g)Make certain that the quantity transmitter direct reading gage and the quantity indicator in the flight compartment give the same indication.

(h)Pressurize the Blue hydraulic system (Ref. 29-10-00, P. Block 301).

(j)Carry out an operational test of the hydraulic actuation and power transmission (slats) (Ref. 27-84-00, P. Block 501).

(k)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).

(5)Close-up.

(a)Remove the container and absorbent material.

(b)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(c)Remove the warning notices.

(d)Remove the access platform.

(e)Close the main landing gear doors (Ref. 32-12-11, P. Block 301).

(f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Blanking Plugs
	B.	Circuit Breaker Safety Clips
	C.	Containers
	D.	Warning Notices
	E.	2 Access Platforms 4.5 m (14 ft)
R	F. 98A54003119200	SPECIAL WRENCH
R	G. 98A54003120200	SPECIAL WRENCH
	H. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
	I. Material No. 19-010	Lockwire 0.8 mm (0.032 in.) (Ref. 20-31-00)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 12-36-29, P. Block 1	Hydraulics
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
	- 36-11-00, P. Block 401	Engine Bleed Air Supply System
	- 36-11-15, P. Block 401	Precooler - Bleed Air
	- 54-54-00, P. Block 401	Aft Fairing
	- 71-00-00, P. Block 501	Power Plant - General
	- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job set-up

(1)Open, safety and tag the following circuit breakers :

(a)Engine 1 Blue Pump :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG/1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	PTU CTL/G/B	1GL	332/U59

(b)Engine 2 Yellow Pump :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	PTU CTL/G/Y	6GL	332/U60

(2)Depressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Depressurize associated hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Display a warning notice on panel 427VU prohibiting operation of the system associated with hydraulic tubes to be removed.
(5)On panel 20VU, pull ENG1 FIRE and ENG2 FIRE handles and display a warning notice prohibiting opening of fire valves.
(6)On HYD PWR section of panel 471VU, check that the fire valves are closed. SHUT legends of FIRE VALVES annunciators are on.
(7)Remove aft fairing (Ref. 54-54-00, P. Block 401).
(8)Remove bleed air precooler (Ref. 36-11-15, P. Block 401).
(9)Remove bleed air precooler cold air inlet duct (Ref. 36-11-00, P. Block 401).
(10)Open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(11)Position two access platforms on each side of pylon.
(12)Remove access panels 473AL (483AL), 415AL (425AL), 474AR (484AR), 416AR (426AR).
(Ref. Fig. 401)
(13)Place a container under tubes to be removed.

B. Removal

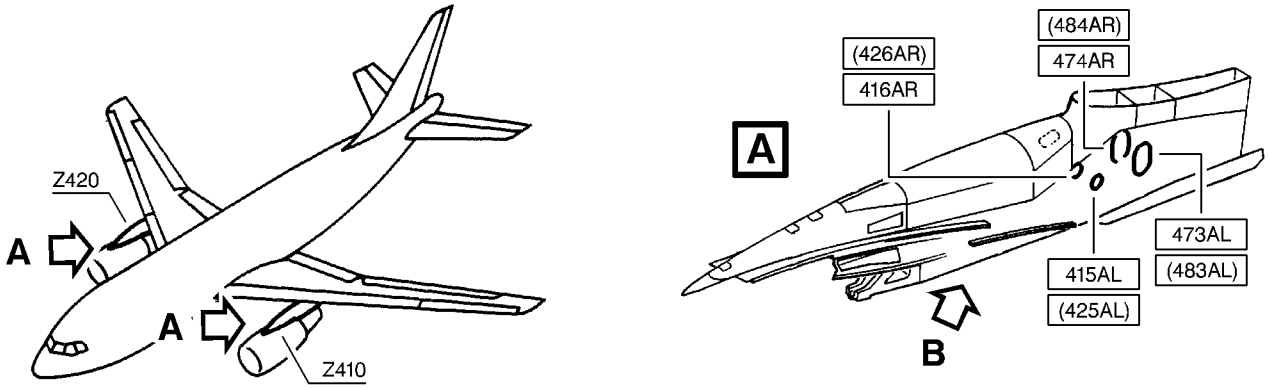
NOTE : Install blanking plugs on disconnected tube ends.

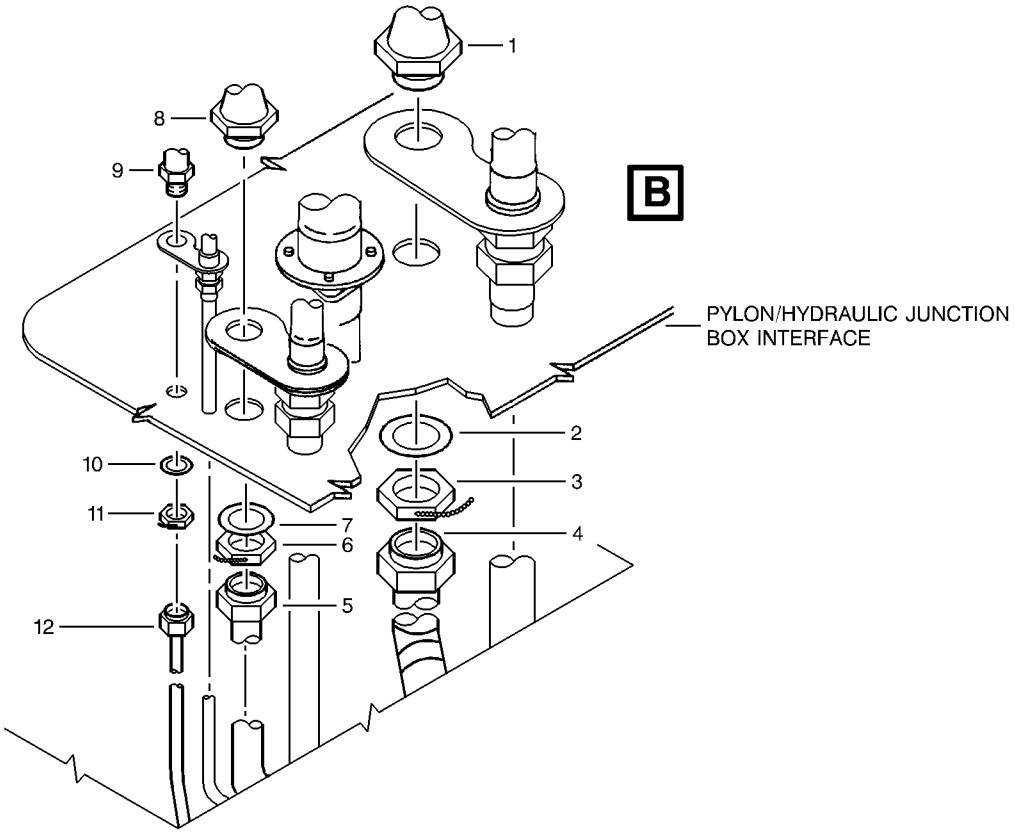
(1)Disconnect tubes at the pylon/hydraulic junction box interface.
(Ref. Fig. 401)

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

(a)Cut, remove and discard lockwire from nut (3).
Loosen suction tube end-fitting (4) and remove nut (3), washer (2) and disconnect suction tube (1).
(b)Cut, remove and discard lockwire from nut (6).
Loosen pressure tube end-fitting (5) and remove nut (6), washer (7) and disconnect pressure tube (8).
(c)Cut, remove and discard lockwire from nut (11).
Loosen case drain tube end-fitting (12) and remove nut (11), washer (10) and disconnect case drain tube (9).

(2)Remove case drain and pressure tubes (aft parts) and remove suction tube clampblocks (rear section).
(Ref. Fig. 402, 403)
(a)Disconnect case drain and pressure tubes at RIB13-14.
(Ref. Fig. 402).
1 Put a container in position.
2 Loosen tube end-fitting (13) and disconnect case drain tube (9) from check valve (14).





BM5 29 12 69 4 AAM0 00

Hydraulic Tubes Disconnection (Forward Section)
Figure 401

3 Loosen tube end-fitting (15), disconnect case drain tube (16) and remove check valve (14).

4 Loosen tube end-fitting (24) from union (23) to disconnect hose (25) from manifold (19).

R 5 Using special wrench 98A54003120200, loosen nut (21) and disconnect pressure tube (22) from union (20).

R 6 Using special wrench 98A54003119200, loosen nut (17) and disconnect pressure tube (8) from union (18) and remove manifold (19).

(b)Remove clampblocks (rear section).
(Ref. Fig. 403)

1 Remove clampblocks at RIB18.
- Cut, remove and discard lockwire from bolts (48) and (49).
- Remove nuts (44), (42) and (53) and spacers (45), (43) and (54).
- Remove the two bolts (48) and washers (47).
- Remove bolt (49) and washer (50).
- Remove clampblocks (46).
- Remove bushings (41), (51) and (52) from tubes (1), (22) and (16) and discard them.

2 Remove clampblocks at RIB16.
- Cut, remove and discard lockwire from bolts (57) and (58).
- Remove the two nuts (55).
- Remove bolt (57) and washer (56).
- Remove bolt (58) and washer (59).
- Remove clampblocks (60).
- Remove bushings (62) and (61) from tubes (22) and (16) and discard them.

3 Remove half-blocks at RIB15.
- Remove the two bolts (63) and washers (64).
- Remove half-blocks (66).
- Remove bushing (65) from tube (22) and discard it.

4 Remove clampblocks at RIB13 and RIB14.
- Cut, remove and discard lockwire from bolts (38) and (69).
- Remove the three nuts (67).
- Remove the two bolts (38) and washers (39).
- Remove bolt (69) and washer (68).
- Remove clampblocks (40).
- Remove bushings (79) and (70) from tubes (1) and (16) and discard them.
- Cut, remove and discard lockwire from bolts (76) and (75).
- Remove the three nuts (71).
- Remove the two bolts (76), washers (77) and cover (37).
- Remove bolt (75) and washer (74).
- Remove clampblocks (78).
- Remove bushings (73) and (72) from tubes (1) and (9) and discard them.

5 Remove clamps at RIB13-14.
- Remove nut (30), spacer (29), washer (28) and bolt (27).
- Remove clamp (31).
- Remove bushing (26) from tube (1) and discard it.
- Remove nut (32), washer (34) and bolt (35).
- Remove clamp (33).

- Remove bushing (36) from tube (1) and discard it.

(c)Remove case drain tube (16) from the rear.

(d)Remove pressure tube (22) from the rear.

(3)Remove case drain and pressure tubes (forward parts) and remove suction tube clampblocks (front section)
(Ref. Fig. 403, 404, 405)
(Ref. Fig. 406)

(a)Remove clampblocks and bulkhead unit at RIB12 (center section).
(Ref. Fig. 404)

1 Remove clampblocks at RIB12.
- Cut, remove and discard lockwire from bolts (90), (96) and (97).
- Remove nut (87), washer (89) and bolt (90).
- Remove nut (92), washer (95) and bolt (96).
- Remove nut (100), washer (98) and bolt (97).
- Remove clampblocks (99).
- Remove bushings (91), (93) and (94) from tubes (1), (8) and (9) and discard them.

2 Remove bulkhead unit at RIB12.
- Remove the ten nuts (88) and remove brackets (86) and (101).
- Remove the two half-collars (85).
- Remove the ten nuts (81).
- Remove the two half-collars (82), the three parts of plate (83) and the ten spacers (84).

(b)Disconnect bonding leads at RIB7.
(Ref. Fig. 405)

1 Remove nut (112), washer (113), bolt (116) and clamp (115) from suction tube (1) and disconnect bonding leads (111) and (114).

2 Remove nut (117), washer (118), bolt (122) and clamp (121) from pressure tube (8) and disconnect bonding leads (120) and (119).

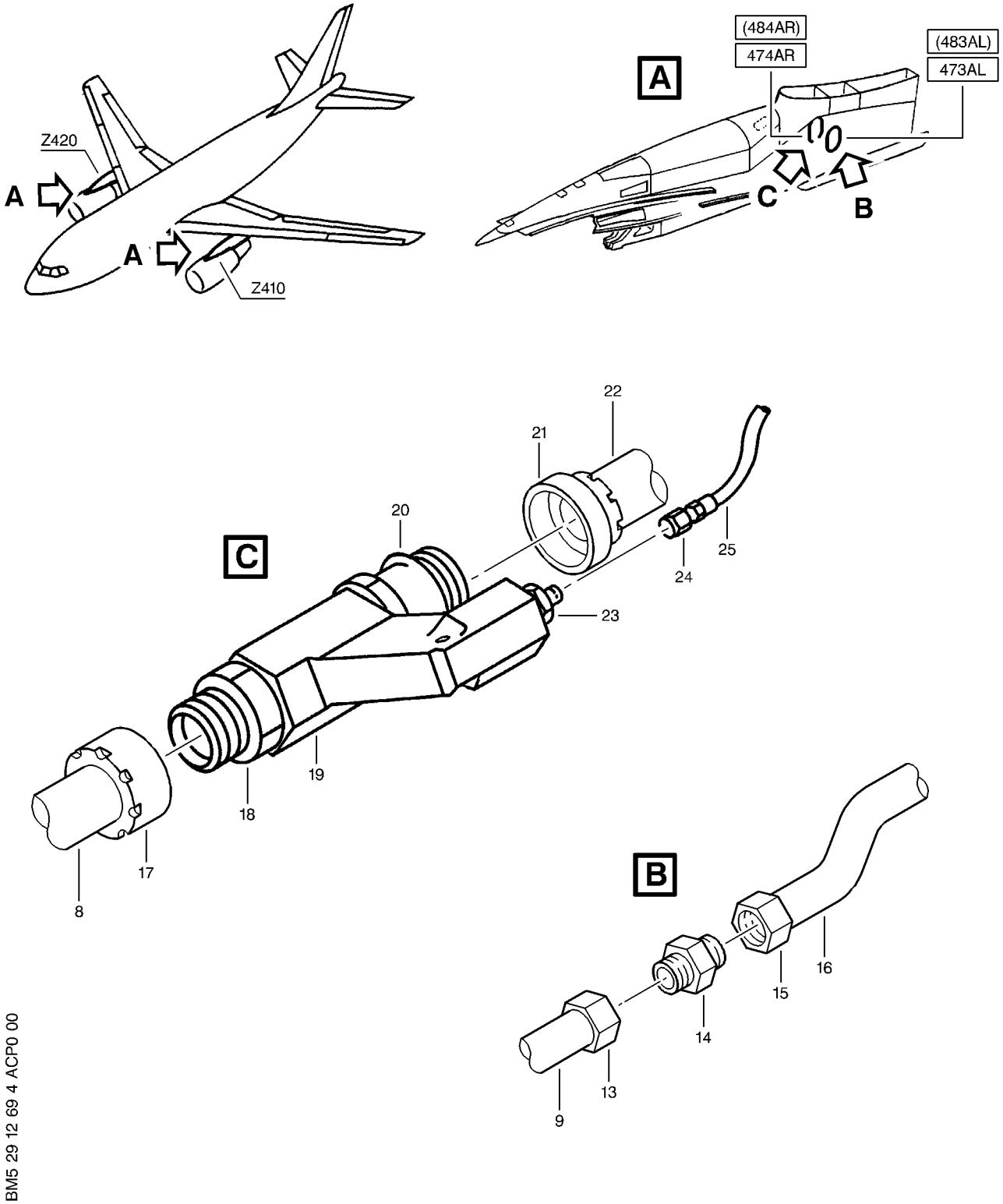
3 Remove nut (127), washer (126), bolt (123) and clamp (124) from case drain tube (9) and disconnect bonding leads (128) and (125).

(c)Remove clampblocks (forward section).
(Ref. Fig. 406)

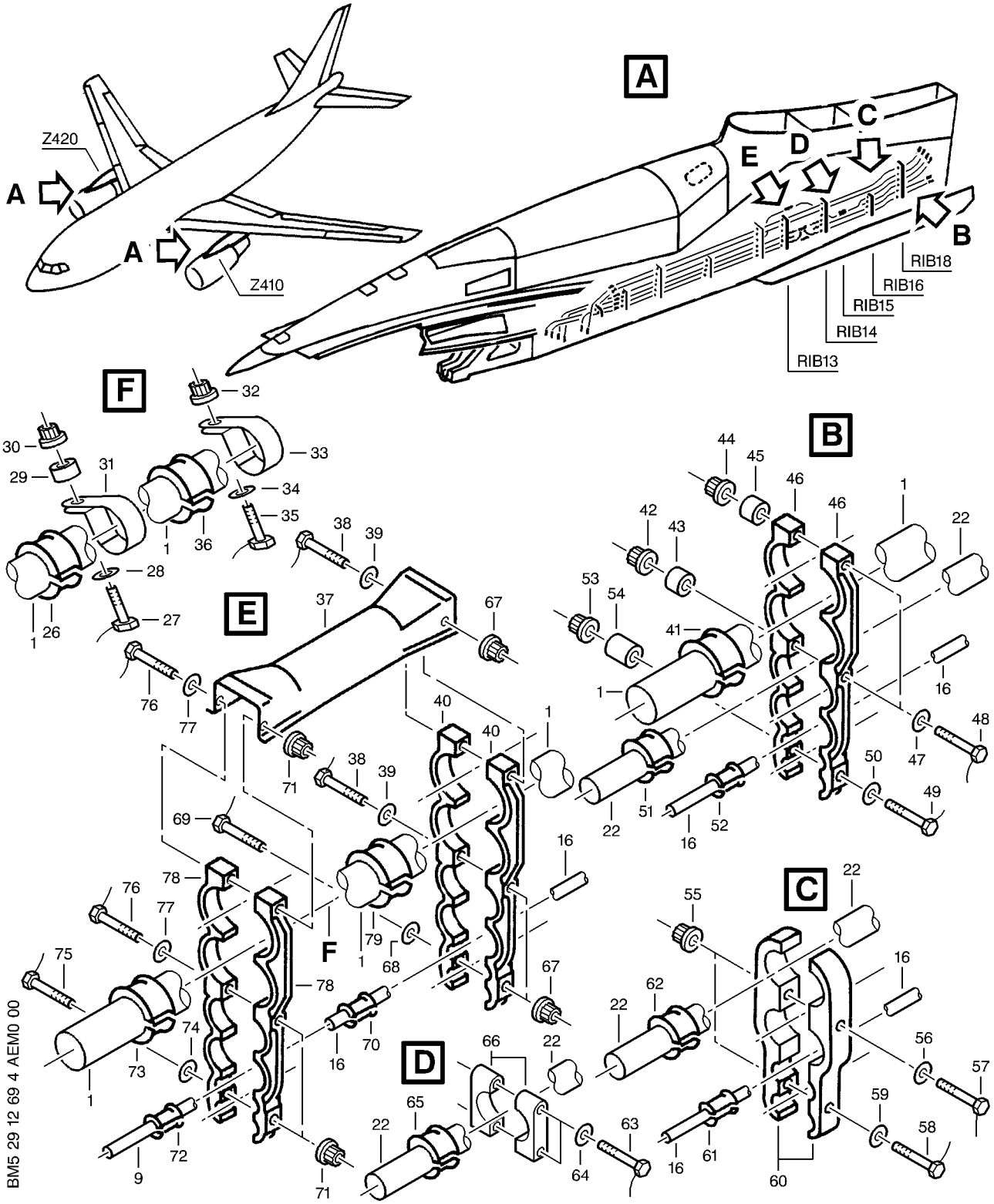
1 Remove clampblocks at RIB10.
- Cut, remove and discard lockwire from bolts (134) and (135).
- Remove the two nuts (131).
- Remove bolt (134) and washer (133).
- Remove bolt (135) and washer (136).
- Remove clampblocks (137).
- Remove bushings (132) and (138) from tubes (8) and (9) and discard them.

2 Remove clampblocks at RIB9.
- Cut, remove and discard lockwire from bolts (139) and (146).
- Remove the two bolts (139) and washers (140).
- Remove bolt (146) and washer (145).
- Remove clampblocks (141).
- Remove bushings (144), (143) and (142) from tubes (1), (8) and (9) and discard them.

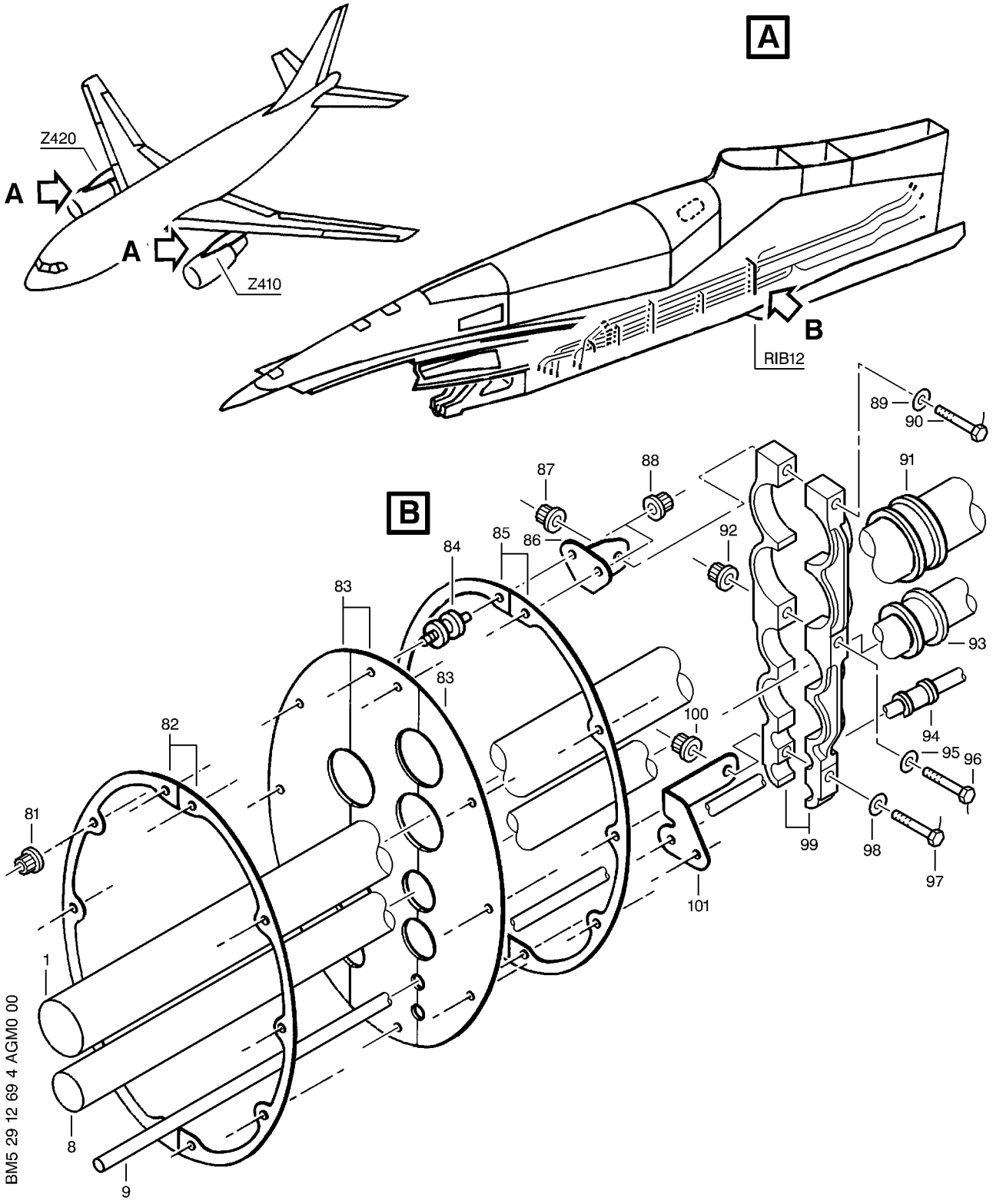
3 Remove clampblocks at RIB7.
- Cut, remove and discard lockwire from bolts (148) and (149).
- Remove the two nuts (154).



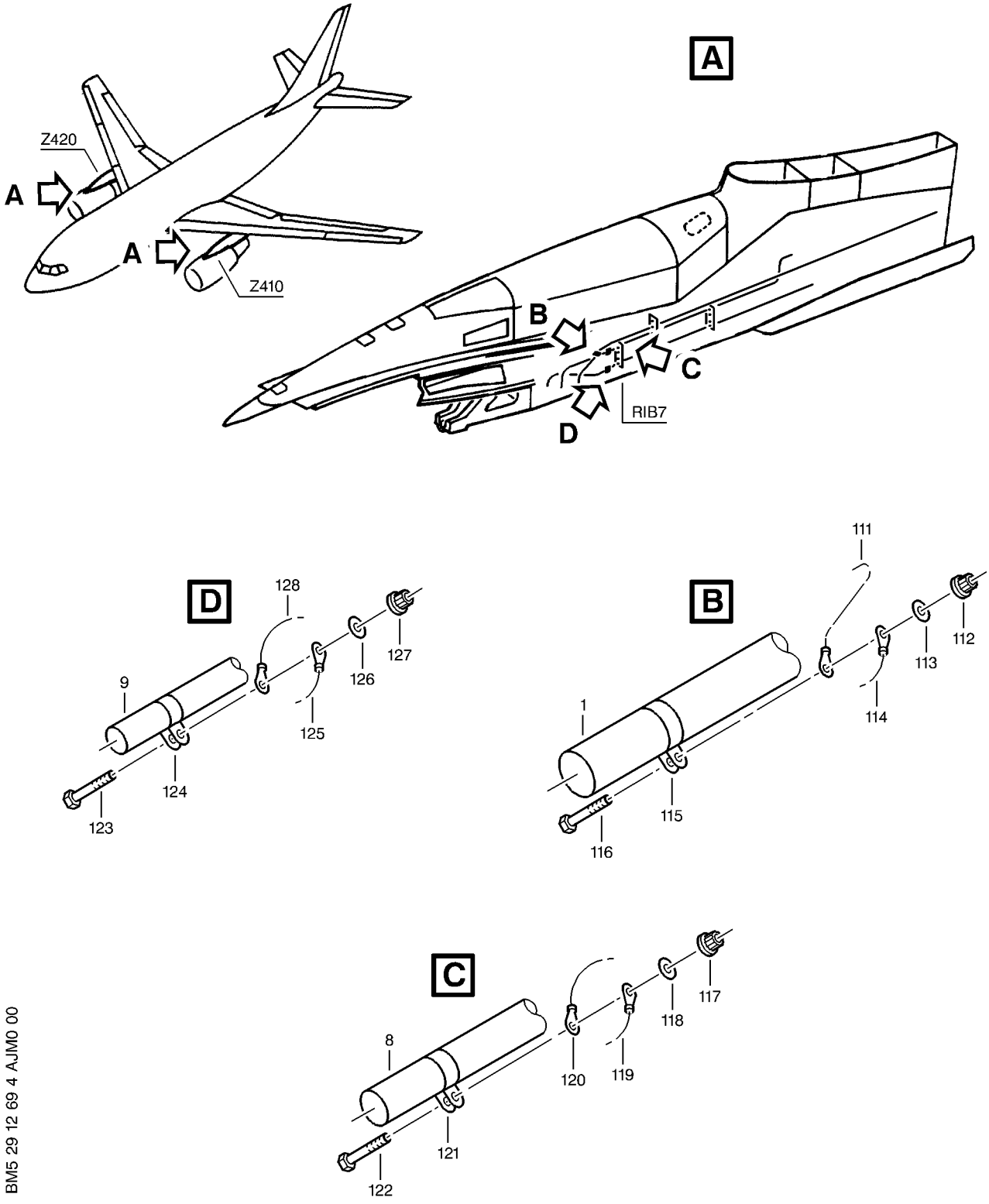
Hydraulic Tubes Disconnection/Connection
Figure 402



Clampblocks Removal/Installation (Rear Section)
Figure 403



Clampblocks and Bulkhead Unit (Center Section)
Figure 404



Bonding Leads Disconnection/Connection
Figure 405

- Remove bolt (148) and washer (147).
- Remove bolt (149) and washer (150).
- Remove clampblocks (151).
- Remove bushings (153) and (152) from tubes (8) and (9) and discard them.

4 Remove half-blocks at RIB6.
- Cut, remove and discard lockwire from bolt (158).
- Remove bolt (158) and washer (157).
- Remove half-blocks (155).
- Remove bushing (156) from case drain tube (9) and discard it.

(d)Remove case drain tube (9) from the rear.
(e)Remove pressure tube (8) from the rear.
(f)Remove suction tube (1) from the rear.

C. Installation

NOTE : Remove blanking plugs from disconnected tube ends.
NOTE : Apply hydraulic fluids (Material No. 02-003) to union threads.

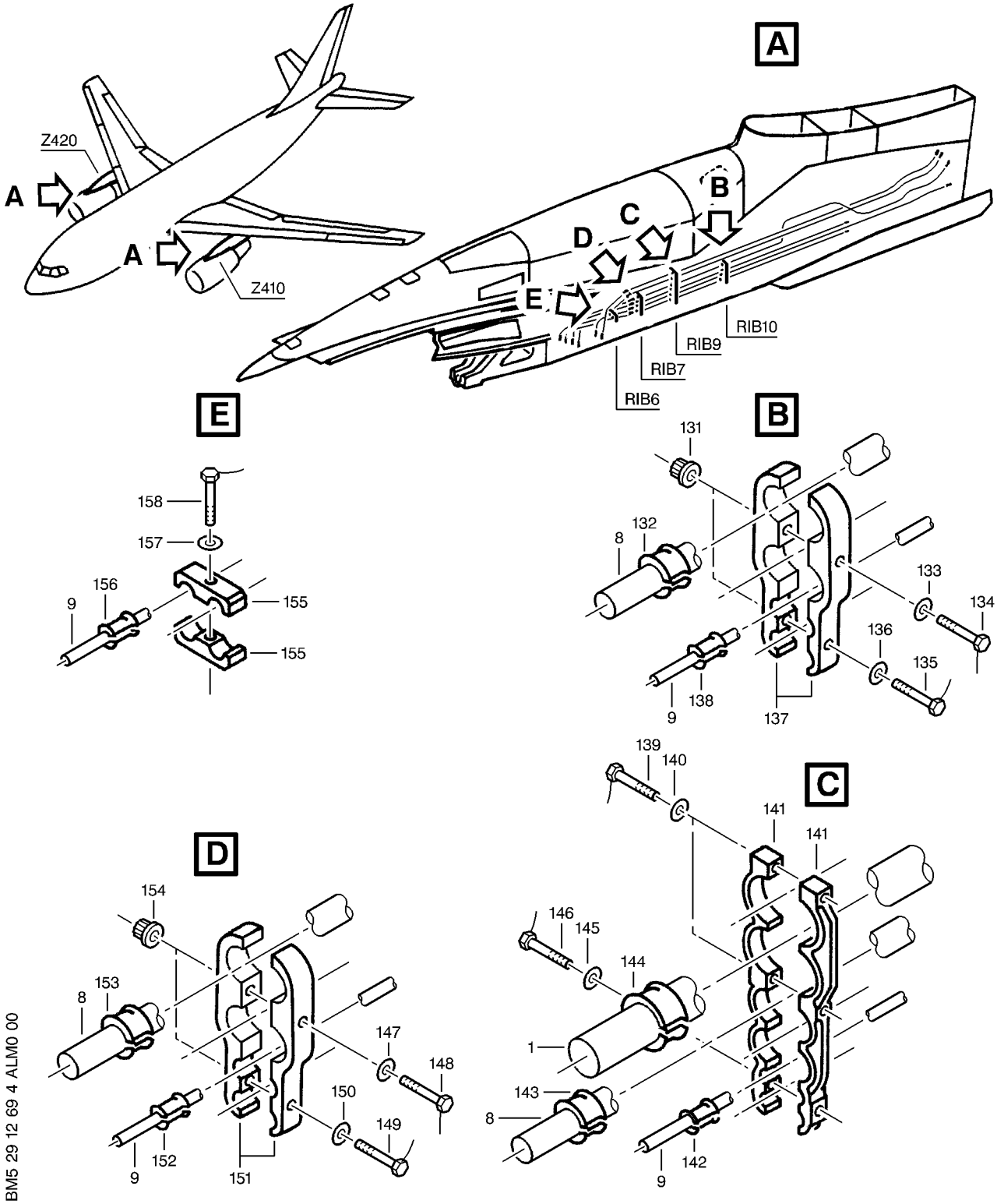
(1)Install case drain and pressure tubes (forward parts) and install suction tube clampblocks (front section).
(Ref. Fig. 403, 404, 405)
(Ref. Fig. 406)
(a)Put in position suction tube (1) from the rear.
(b)Put in position pressure tube (8) from the rear.
(c)Put in position case drain tube (9) from the rear.
(d)Install clampblocks (forward section).
(Ref. Fig. 406)

1 Install half-blocks at RIB6
- Install new bushing (156) on tube (9).
- Put half-blocks (155) in position.
- Install washer (157) and bolt (158).
- Tighten bolt (158) and safety it with lockwire (Material No. 19-010).

2 Install clampblocks at RIB7.
- Install new bushings (153) and (152) on tubes (8) and (9).
- Put clampblocks (151) in position.
- Install bolt (148) and washer (147).
- Install bolt (149) and washer (150).
- Install the two nuts (154) and tighten them.
- Safety bolts (148) and (149) with lockwire (Material No. 19-010).

3 Install clampblocks at RIB9.
- Install new bushings (144), (143) and (142) on tubes (1), (8) and (9).
- Put clampblocks (141) in position.
- Install bolt (146) and washer (145).
- Install the two bolts (139) and washers (140).
- Tighten bolts (139) and (146) and safety them with lockwire (Material No. 19-010).

4 Install clampblocks at RIB10.
- Install new bushings (132) and (138) on tubes (8) and (9).
- Put clampblocks (137) in position.
- Install bolt (134) and washer (133).



Clampblocks Removal/Installation (Forward Section)
Figure 406

- Install bolt (135) and washer (136).
- Install the two nuts (131) and tighten them.
- Safety bolts (134) and (135) with lockwire (Material No. 19-010).

(e)Connect bonding leads at RIB7.
(Ref. Fig. 405)

1 Install clamp (124) on tube (9).
- Install bolt (123), washer (126) and connect bonding leads (128) and (125).
- Install nut (127) and tighten it.

2 Install clamp (121) on tube (8).
- Install bolt (122), washer (118) and connect bonding leads (120) and (119).
- Install nut (117) and tighten it.

3 Install clamp (115) on tube (1).
- Install bolt (116), washer (113) and connect bonding leads (111) and (114).
- Install nut (112) and tighten it.

(f)Install bulkhead unit and clampblocks at RIB12 (center section).
(Ref. Fig. 404)

1 Install bulkhead unit at RIB12.
- Assemble the ten spacers (84) with the three parts of plate (83) and the two half-collars (82).
- Install the ten nuts (81) and tighten them.
- Assemble the two half-collars (85) and the two brackets (86) and (101).
- Install the ten nuts (88) and tighten them.

2 Install clampblocks at RIB12.
- Install new bushings (91), (93) and (94) on tubes (1), (8) and (9).
- Put clampblocks (99) in position.
- Install bolt (90) and washer (89). Assemble with bracket (86) and install nut (87).
- Install bolt (96), washer (95) and nut (92).
- Install bolt (97) and washer (98). Assemble with bracket (101) and install nut (100).
- Tighten nuts (87), (92) and (100).
- Safety bolts (90), (96) and (97) with lockwire (Material No. 19-010).

(2)Install case drain and pressure tubes (aft parts) and install suction tube clampblocks (rear section).
(Ref. Fig. 402, 403)

(a)Put in position case drain tube (16) from the rear.
(b)Put in position pressure tube (22) from the rear.
(c)Install clampblocks (rear section).
(Ref. Fig. 403)

1 Install clampblocks at RIB18.
- Install new bushings (41), (51) and (52) on tubes (1), (22) and (16).
- Put clampblocks (46) in position.
- Install bolt (49) and washer (50).
- Install the two bolts (48) and washers (47).
- Install spacers (45), (43) and (54) and nuts (44), (42) and (53).

Tighten nuts.
- Safety bolts (48) and (49) with lockwire (Material No. 19-010).

2 Install clampblocks at RIB16.
- Install new bushings (62) and (61) on tubes (22) and (16).
- Put clampblocks (60) in position.
- Install bolt (57) and washer (56).
- Install bolt (58) and washer (59).
- Install the two nuts (55) and tighten them.
- Safety bolts (57) and (58) with lockwire (Material No. 19-010)

3 Install half-blocks at RIB15.
- Install new bushing (65) on tube (22).
- Put half-blocks (66) in position.
- Install the two bolts (63) and washers (64).
- Tighten bolts (63) and safety them with lockwire (Material No. 19-010)

4 Install clamps at RIB13-14.
- Install new bushings (26) and (36) on tube (1).
- Put clamp (31) in position .
- Install bolt (27), washer (28), spacer (29) and nut (30).
- Tighten nut (30).
- Put clamp (33) in position.
- Install bolt (35), washer (34) and nut (32).
- Tighten nut (32).

5 Install clampblocks at RIB13 and RIB14.
- Install new bushings (79) and (70) on tubes (1) and (16).
- Install new bushings (73) and (72) on tubes (1) and (9).
- Put clampblocks (40) and (78) in position.
- Install bolt (69) and washer (68).
- Install bolt (75) and washer (74).
- Put cover (37) in position.
- Install the two bolts (38) and washers (39).
- Install the two bolts (76) and washers (77).
- Install nuts (67) and (71) and tighten them.
- Safety bolts (38) and (69) with lockwire (Material No. 19-010).
- Safety bolts (76) and (75) with lockwire (Material No. 19-010).

(d)Connect case drain and pressure tubes at RIB13-14.
(Ref. Fig. 402)

1 Put manifold (19) in position.

2 Connect pressure tube (22) to union (20). Position nut (21) with
R special wrench 98A54003120200 and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

3 Connect pressure tube (8) to union (18). Position nut (17) with
R special wrench 98A54003119200 and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

4 Connect hose (25) to union (23). Position tube end-fitting (24) to union (23) and TORQUE to between 132 and 150 lbf.in. (1.5 and 1.7 m.daN).

5 Put check valve (14) in position.

6 Connect case drain tube (16) to check valve (14). Position tube end-fitting (15) and TORQUE to between 141 and 150 lbf.in. (1.6 and 1.7 m.daN).

7 Connect case drain tube (9) to check valve (14). Position tube end-fitting (13) and TORQUE to between 141 and 150 lbf.in. (1.6 and 1.7 m.daN).

(3)Connect tubes at the pylon/hydraulic junction box interface. (Ref. Fig. 401)

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

(a)Connect case drain tube (9).

1 Install washer (10) and nut (11).

2 Position case drain tube end-fitting (12) and TORQUE to between 256 and 283 lbf.in. (2.9 and 3.2 m.daN).

3 TORQUE nut (11) to 256 lbf.in. (2.9 m.daN). Safety nut (11) with lockwire (Material No. 19-010).

(b)Connect pressure tube (8).

1 Install washer (7) and nut (6).

2 Position pressure tube end-fitting (5) and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

3 TORQUE nut (6) to 1141 lbf.in. (12.9 m.daN). Safety nut (6) with lockwire (Material No. 19-010).

(c)Connect suction tube (1).

1 Install washer (2) and nut (3).

2 Position suction tube end-fitting (4) and TORQUE to between 1398 and 1601 lbf.in. (15.8 and 18.1 m.daN).

3 TORQUE nut (3) to 1398 lbf.in. (15.8 m.daN). Safety nut (3) with lockwire (Material No. 19-010).

(4)Install bleed air precooler cold air inlet duct (Ref. 36-11-00, P. Block 401).

(5)Install bleed air precooler (Ref. 36-11-15, P. Block 401).

(6)Install aft fairing (Ref. 54-54-00, P. Block 401).

D. Test

(1)Remove safety clips and tags and close the following circuit breakers :

(a)For Engine 1 Blue Pump :

- 5GD, 31GJ, 101GK and 1GL.

(b)For Engine 2 Yellow Pump :

- 1GD, 5GD, 103GK and 6GL.

(2)Remove warning notices.

(3)On panel 20VU, push ENG1 FIRE and ENG2 FIRE handles.

(4)On HYD PWR section of panel 471VU, check that the fire valves are open. OPEN legends of FIRE VALVES annunciators are on.

(5)Pressurize associated hydraulic system reservoir (Ref. 29-14-00, P. Block 301).

(6)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(7)On ECAM control panel, press HYD pushbutton switch and on panel 427VU, make certain that corresponding ENG PUMP pushbutton switch is pressed (in).

(8)Dry-motor the engine (Ref. 71-00-00, P. Block 501).

(9)Check connections for leakage.

(10)On right ECAM display unit, check that pressure reading is 3000 ± 200 psi (206 ± 13.5 bars) for corresponding hydraulic

system.

(11)On overhead panel 427VU, release the corresponding **ENG PUMP** pushbutton switch (the **OFF** legend comes on). On right **ECAM** display unit, check that pressure reading drops to 0 psi (0 bar) for the corresponding hydraulic system.

(12)Stop dry-motoring engine.

(13)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).

E. Close-up

(1)Remove containers and make certain that working areas are clean and clear of tools and miscellaneous items of equipment.

(2)Install access panels.

(3)Remove access platforms.

(4)Close thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

HYDRAULIC TUBES - PYLON - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Circuit Breaker Safety Clips
C.	Containers
D.	Warning Notices
E.	2 Access Platforms 4.5 m (14 ft)
F. 98A54003119200	SPECIAL WRENCH
G. 98A54003120200	SPECIAL WRENCH
H. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
I. Material No. 19-010	Lockwire 0.8 mm (0.032 in.) (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 12-36-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 36-11-00, P. Block 401	Engine Bleed Air Supply System
- 36-11-15, P. Block 401	Precooler - Bleed Air
- 54-54-00, P. Block 401	Aft Fairing
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job set-up

(1)Open, safety and tag the following circuit breakers :

(a)For Engine 1 Blue Pump :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG/1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	PTU CTL/G/B	1GL	332/U59

(b)For Engine 2 Yellow Pump :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	PTU CTL/G/Y	6GL	332/U60

(2)Depressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Depressurize associated hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Display a warning notice on panel 427VU prohibiting operation of the system associated with hydraulic tubes to be removed.
(5)On panel 20VU, pull ENG1 FIRE and ENG2 FIRE handles and display a warning notice prohibiting opening of fire valves.
(6)On HYD PWR section of panel 471VU, check that the fire valves are closed. SHUT legends of FIRE VALVES annunciators are on.
(7)Remove aft fairing (Ref. 54-54-00, P. Block 401).
(8)Remove bleed air precooler (Ref. 36-11-15, P. Block 401).
(9)Remove bleed air precooler cold air inlet duct (Ref. 36-11-00, P. Block 401).
(10)Open thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(11)Position two access platforms on each side of pylon.
(12)Remove access panels 473AL (483AL), 415AL (425AL), 474AR (484AR), 416AR (426AR).
(Ref. Fig. 401)
(13)Place a container under tubes to be removed.

B. Removal

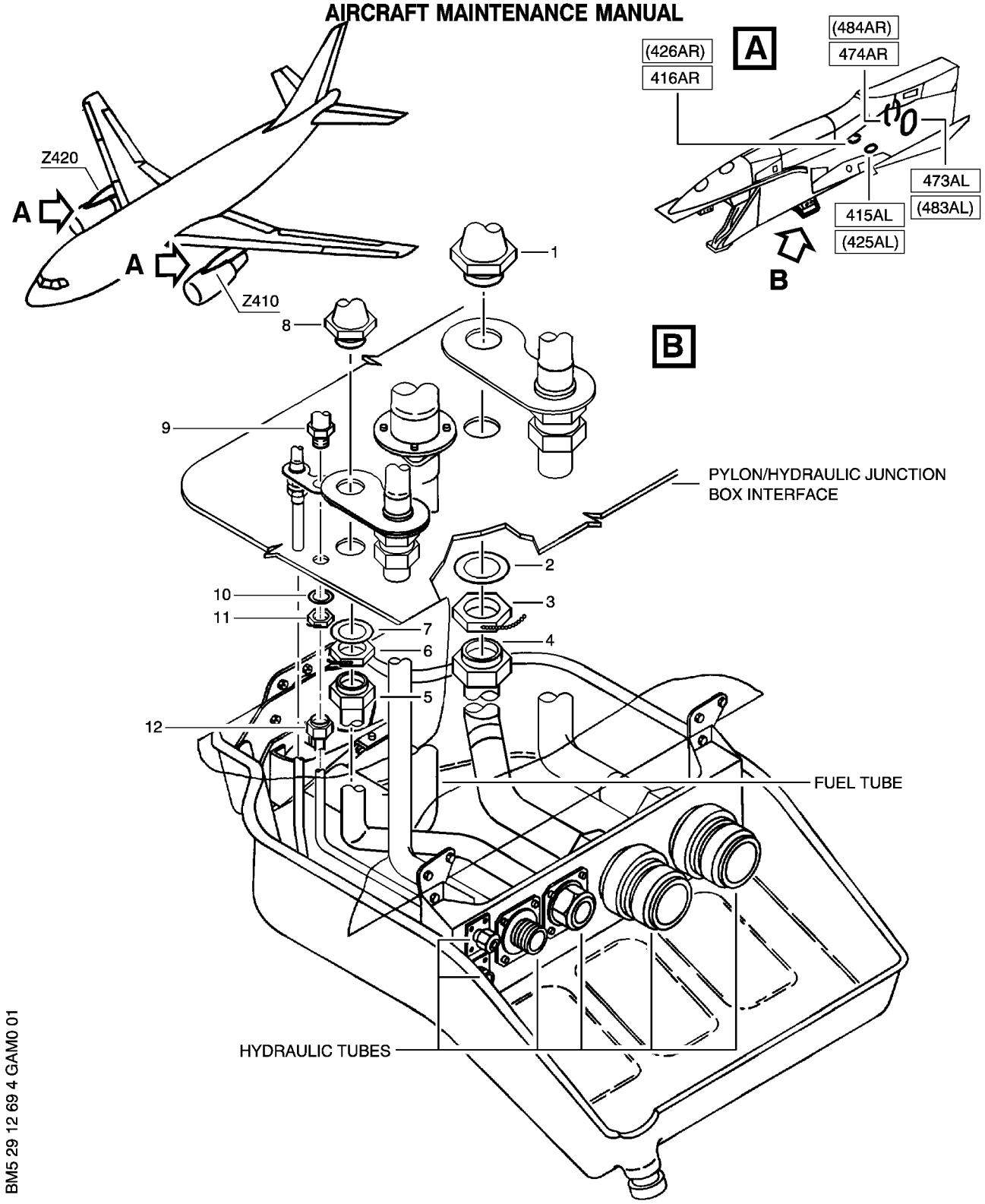
NOTE : Install blanking plugs on disconnected tube ends.

(1)Disconnect tubes at the pylon/hydraulic junction box interface.
(Ref. Fig. 401)

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

(a)Cut, remove and discard lockwire from nut (3).
Loosen suction tube end-fitting (4) and remove nut (3), washer (2) and disconnect suction tube (1).
(b)Cut, remove and discard lockwire from nut (6).
Loosen pressure tube end-fitting (5) and remove nut (6), washer (7) and disconnect pressure tube (8).
(c)Cut, remove and discard lockwire from nut (11).
Loosen case drain tube end-fitting (12) and remove nut (11), washer (10) and disconnect case drain tube (9).

(2)Remove case drain and pressure tubes (aft parts) and remove suction tube clampblocks (rear section).
(Ref. Fig. 402, 403)
(a)Disconnect case drain and pressure tubes at RIB13-14.
(Ref. Fig. 402).
1 Put a container in position.
2 Loosen tube end-fitting (13) and disconnect case drain tube (9) from check valve (14).



Hydraulic Tubes Disconnection (Forward Section)
Figure 401

R

3 Loosen tube end-fitting (15), disconnect case drain tube (16) and remove check valve (14).
4 Loosen tube end-fitting (24) from union (23) to disconnect hose (25) from manifold (19).
5 Using special wrench 98A54003120200, loosen nut (21) and disconnect pressure tube (22) from union (20).
6 Using special wrench 98A54003119200, loosen nut (17) and disconnect pressure tube (8) from union (18) and remove manifold (19).

(b)Remove clampblocks (rear section).
(Ref. Fig. 403)

1 Remove clampblocks at RIB18.
- Cut, remove and discard lockwire from bolts (48) and (49).
- Remove nuts (44), (42) and (53) and spacers (45), (43) and (54).
- Remove the two bolts (48) and washers (47).
- Remove bolt (49) and washer (50).
- Remove clampblocks (46).
- Remove bushings (41), (51) and (52) from tubes (1), (22) and (16) and discard them.

2 Remove clampblocks at RIB16.
- Cut, remove and discard lockwire from bolts (57) and (58).
- Remove the two nuts (55).
- Remove bolt (57) and washer (56).
- Remove bolt (58) and washer (59).
- Remove clampblocks (60).
- Remove bushings (62) and (61) from tubes (22) and (16) and discard them.

3 Remove half-blocks at RIB15.
- Remove the two bolts (63) and washers (64).
- Remove half-blocks (66).
- Remove bushing (65) from tube (22) and discard it.

4 Remove clampblocks at RIB13 and RIB14.
- Cut, remove and discard lockwire from bolts (38) and (69).
- Remove the three nuts (67).
- Remove the two bolts (38) and washers (39).
- Remove bolt (69) and washer (68).
- Remove clampblocks (40).
- Remove bushings (79) and (70) from tubes (1) and (16) and discard them.
- Cut, remove and discard lockwire from bolts (76) and (75).
- Remove the three nuts (71).
- Remove the two bolts (76), washers (77) and cover (37).
- Remove bolt (75) and washer (74).
- Remove clampblocks (78).
- Remove bushings (73) and (72) from tubes (1) and (9) and discard them.

5 Remove clamps at RIB13-14.
- Remove nut (30), spacer (29), washer (28) and bolt (27).
- Remove clamp (31).
- Remove bushing (26) from tube (1) and discard it.
- Remove nut (32), washer (34) and bolt (35).
- Remove clamp (33).

- Remove bushing (36) from tube (1) and discard it.

(c)Remove case drain tube (16) from the rear.

(d)Remove pressure tube (22) from the rear.

(3)Remove case drain and pressure tubes (forward parts) and remove suction tube clampblocks (front section).
(Ref. Fig. 403, 404, 405)
(Ref. Fig. 406)

(a)Remove clampblocks and bulkhead unit at RIB12 (center section).
(Ref. Fig. 404)

1 Remove clampblocks at RIB12.
- Cut, remove and discard lockwire from bolts (90), (96) and (97).
- Remove nut (87), washer (89) and bolt (90).
- Remove nut (92), washer (95) and bolt (96).
- Remove nut (100), washer (98) and bolt (97).
- Remove clampblocks (99).
- Remove bushings (91), (93) and (94) from tubes (1), (8) and (9) and discard them.

2 Remove bulkhead unit at RIB12.
- Remove the ten nuts (88) and remove brackets (86) and (101).
- Remove the two half-collars (85).
- Remove the ten nuts (81).
- Remove the two half-collars (82), the three parts of plate (83) and the ten spacers (84).

(b)Disconnect bonding leads at RIB7.
(Ref. Fig. 405)

1 Remove nut (112), washer (113), bolt (116) and clamp (115) from suction tube (1) and disconnect bonding leads (111) and (114).

2 Remove nut (117), washer (118), bolt (122) and clamp (121) from pressure tube (8) and disconnect bonding leads (120) and (119).

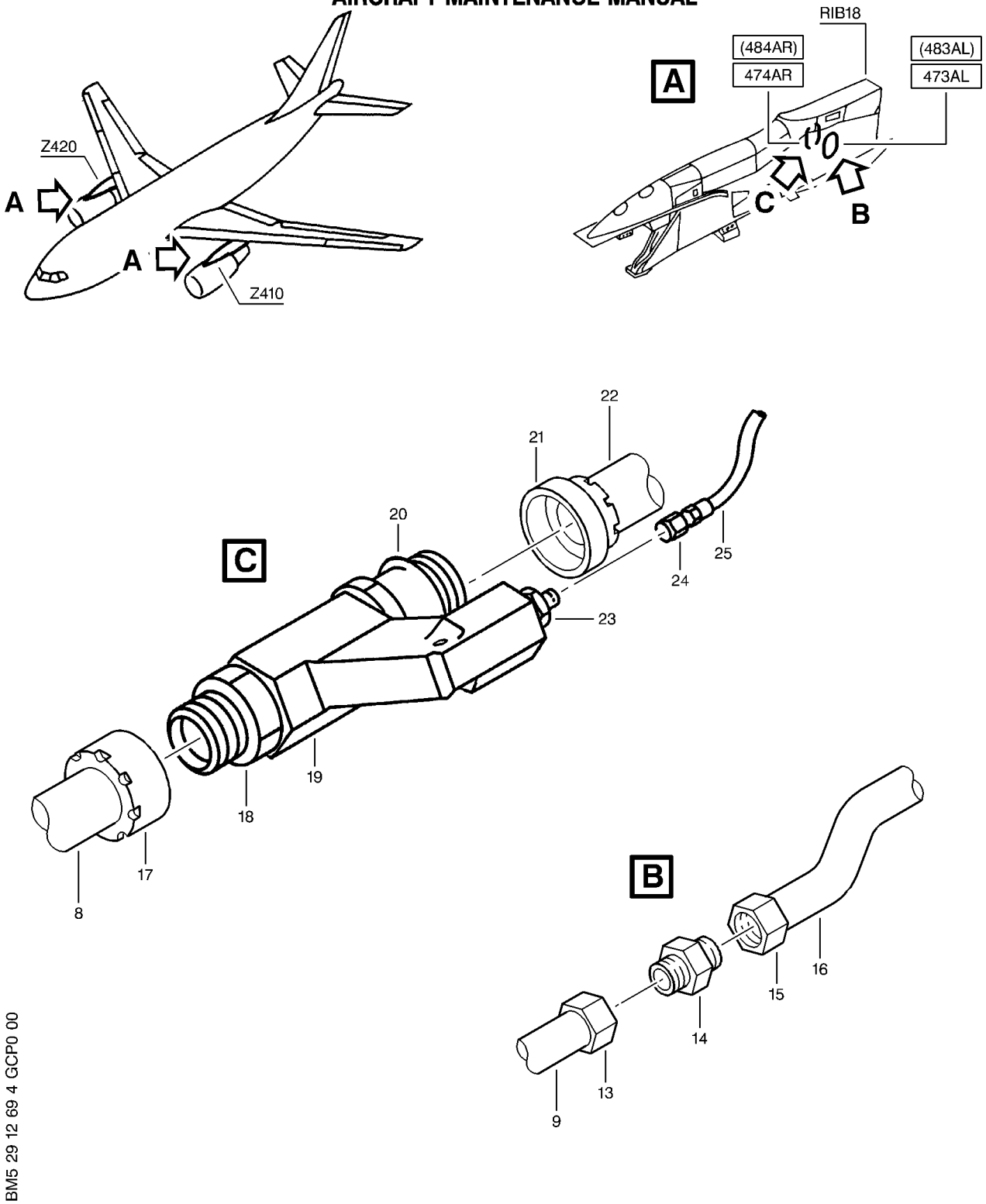
3 Remove nut (127), washer (126), bolt (123) and clamp (124) from case drain tube (9) and disconnect bonding leads (128) and (125).

(c)Remove clampblocks (forward section).
(Ref. Fig. 406)

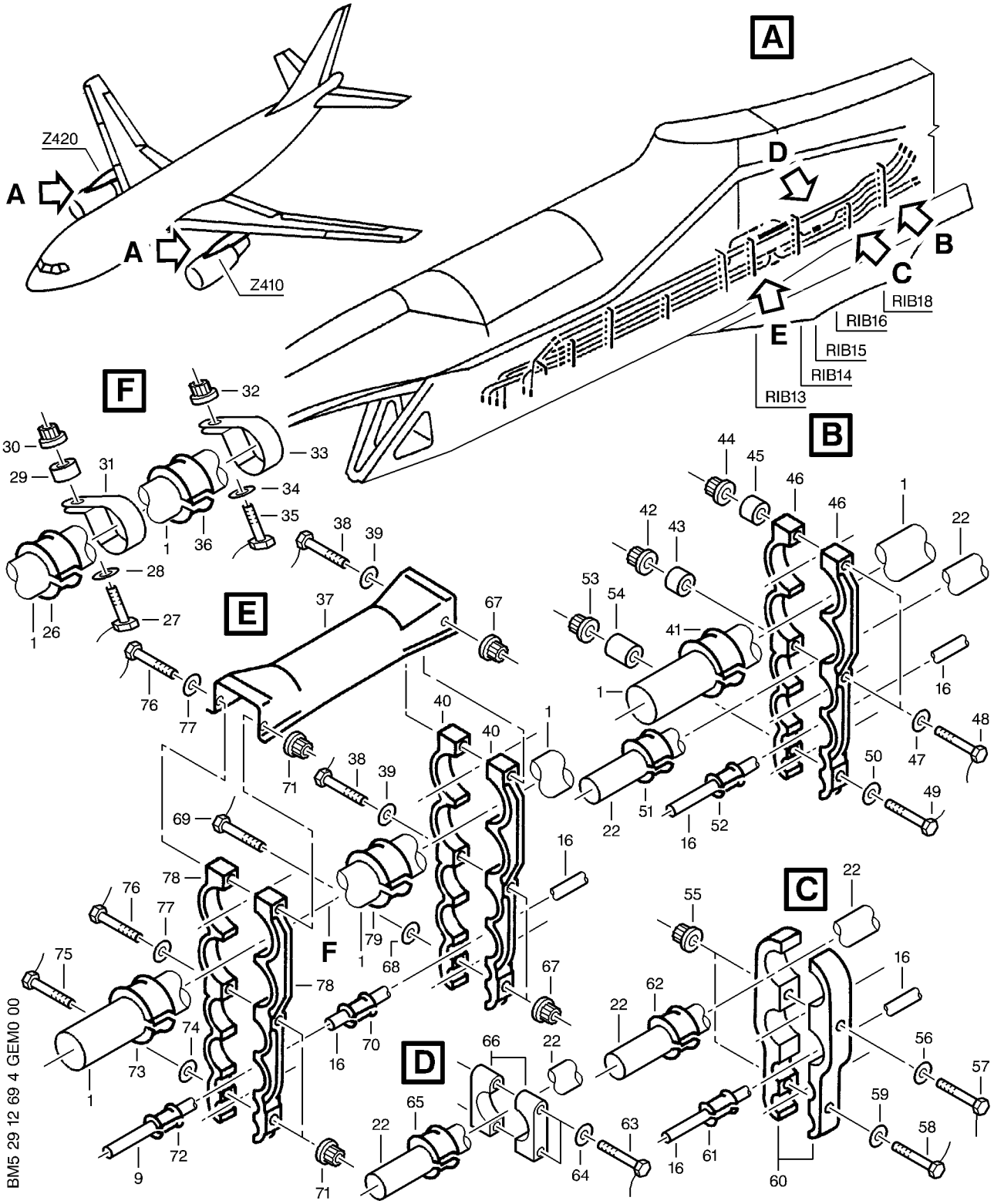
1 Remove clampblocks at RIB10.
- Cut, remove and discard lockwire from bolts (134) and (135).
- Remove the two nuts (131).
- Remove bolt (134) and washer (133).
- Remove bolt (135) and washer (136).
- Remove clampblocks (137).
- Remove bushings (132) and (138) from tubes (8) and (9) and discard them.

2 Remove clampblocks at RIB9.
- Cut, remove and discard lockwire from bolts (139) and (146).
- Remove the two bolts (139) and washers (140).
- Remove bolt (146) and washer (145).
- Remove clampblocks (141).
- Remove bushings (144), (143) and (142) from tubes (1), (8) and (9) and discard them.

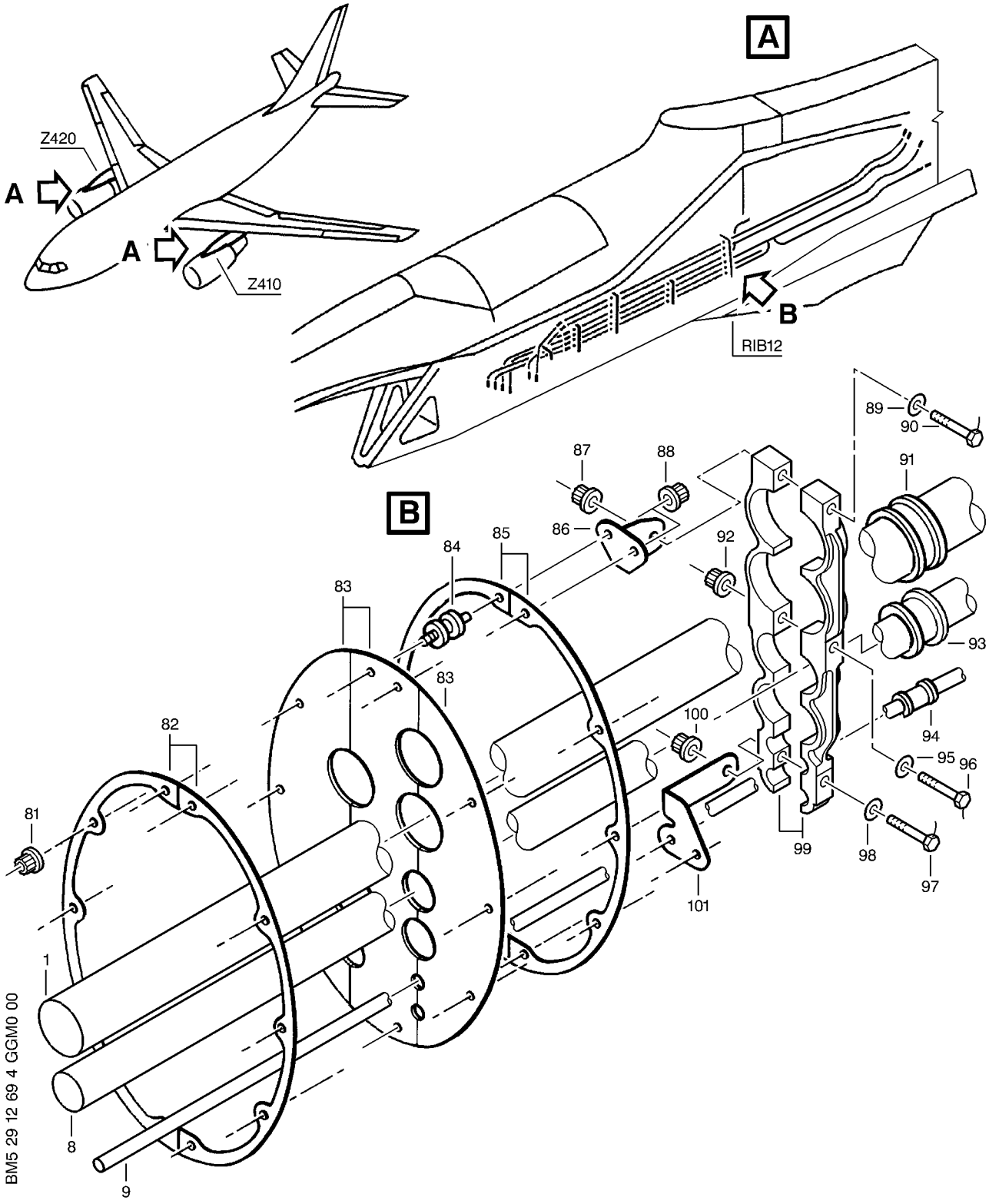
3 Remove clampblocks at RIB7.
- Cut, remove and discard lockwire from bolts (148) and (149).
- Remove the two nuts (154).



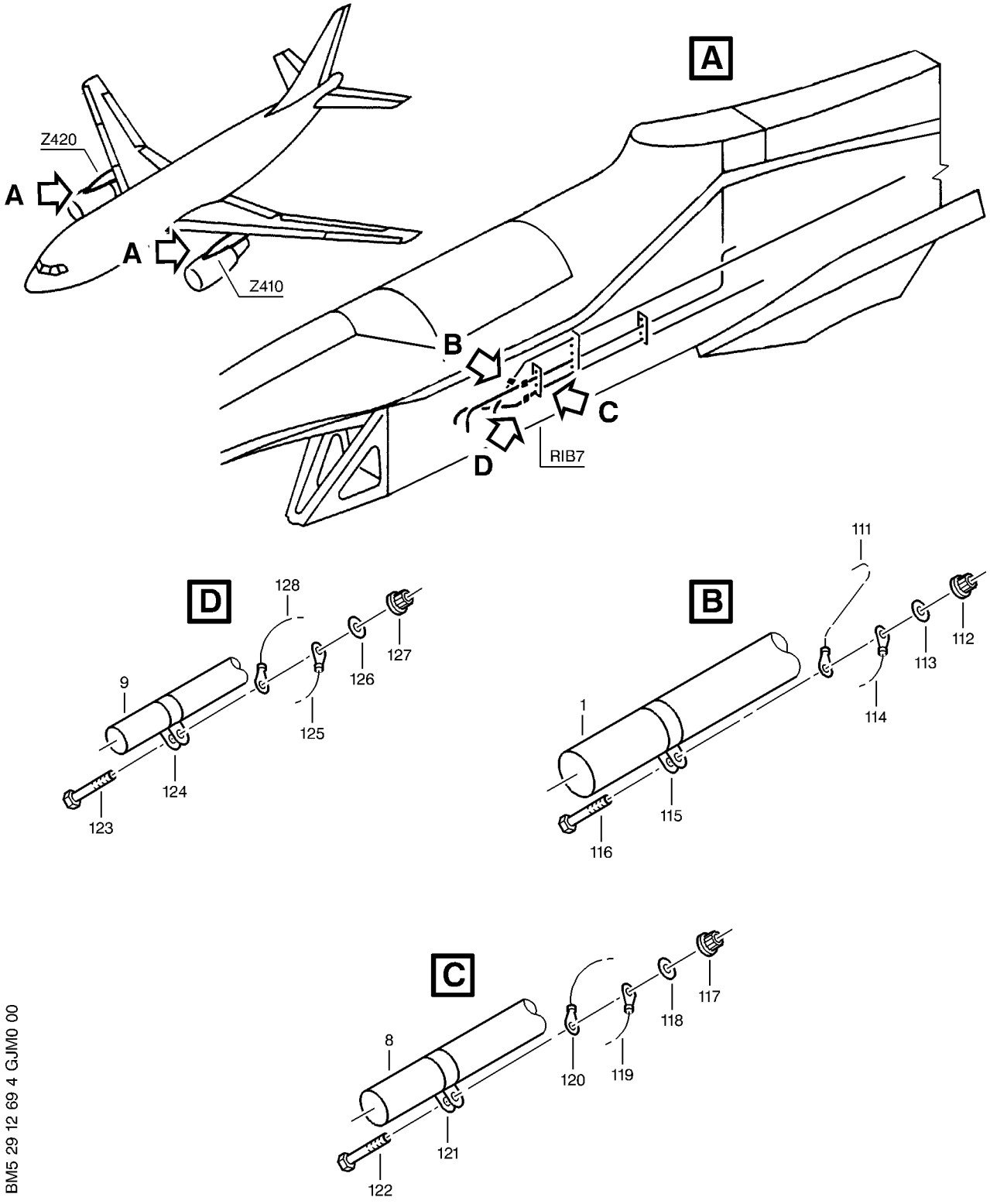
Hydraulic Tubes Disconnection/Connection
Figure 402



Clampblocks Removal/Installation (Rear Section)
Figure 403



Clampblocks and Bulkhead Unit (Center Section)
Figure 404



BM5 29 12 69 4 GJM0 00

Bonding Leads Disconnection/Connection
Figure 405

- Remove bolt (148) and washer (147).
- Remove bolt (149) and washer (150).
- Remove clampblocks (151).
- Remove bushings (153) and (152) from tubes (8) and (9) and discard them.

4 Remove half-blocks at RIB6.
- Cut, remove and discard lockwire from bolt (158).
- Remove bolt (158) and washer (157).
- Remove half-blocks (155).
- Remove bushing (156) from case drain tube (9) and discard it.

(d)Remove case drain tube (9) from the rear.
(e)Remove pressure tube (8) from the rear.
(f)Remove suction tube (1) from the rear.

C. Installation

NOTE : Remove blanking plugs from disconnected tube ends.
NOTE : Apply hydraulic fluids (Material No. 02-003) to union threads.

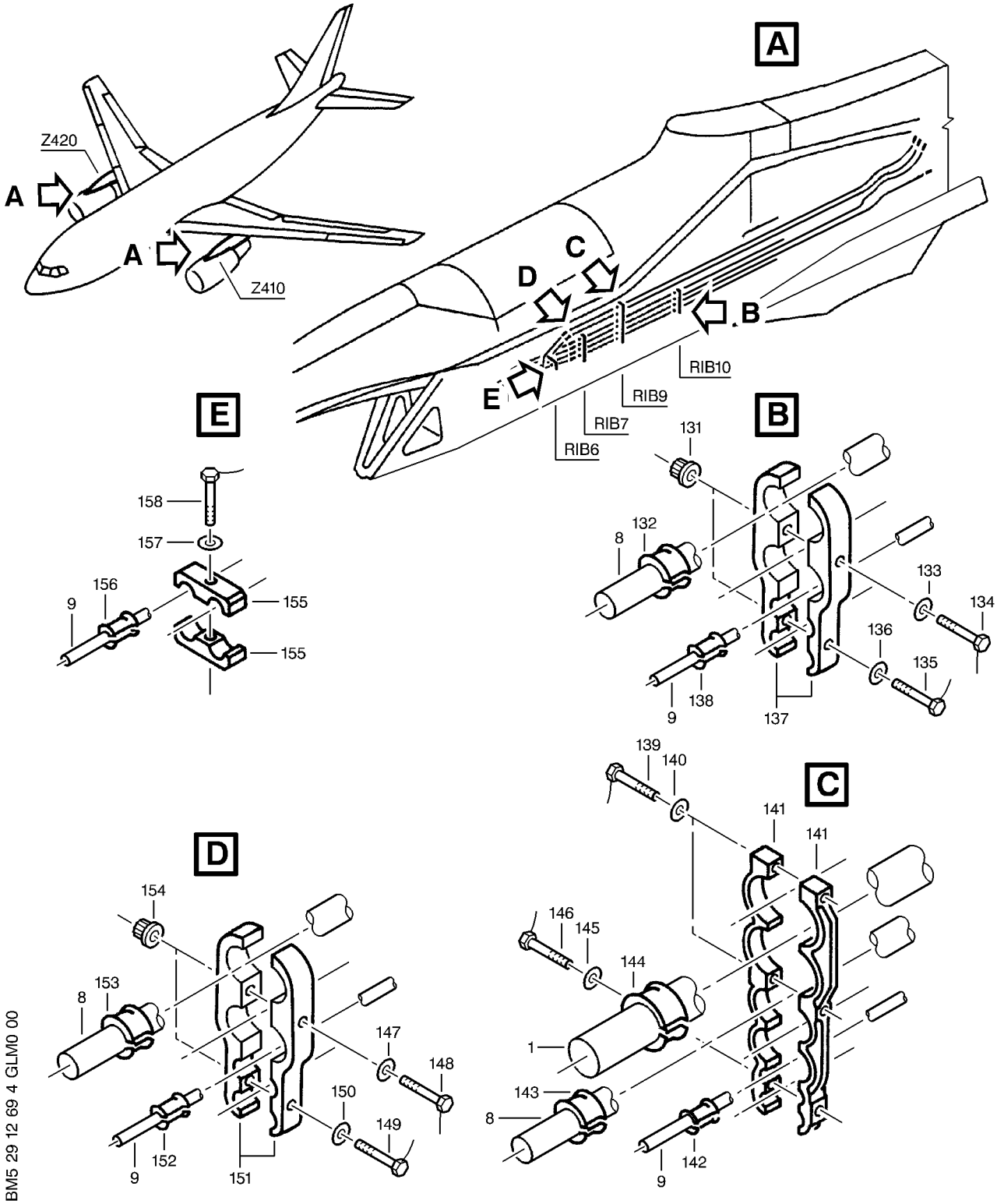
(1)Install case drain and pressure tubes (forward parts) and install suction tube clampblocks (front section).
(Ref. Fig. 403, 404, 405)
(Ref. Fig. 406)
(a)Put in position suction tube (1) from the rear.
(b)Put in position pressure tube (8) from the rear.
(c)Put in position case drain tube (9) from the rear.
(d)Install clampblocks (forward section).
(Ref. Fig. 406)

1 Install half-blocks at RIB6.
- Install new bushing (156) on tube (9).
- Put half-blocks (155) in position.
- Install washer (157) and bolt (158).
- Tighten bolt (158) and safety it with lockwire (Material No. 19-010).

2 Install clampblocks at RIB7.
- Install new bushings (153) and (152) on tubes (8) and (9).
- Put clampblocks (151) in position.
- Install bolt (148) and washer (147).
- Install bolt (149) and washer (150).
- Install the two nuts (154) and tighten them.
- Safety bolts (148) and (149) with lockwire (Material No. 19-010).

3 Install clampblocks at RIB9.
- Install new bushings (144), (143) and (142) on tubes (1), (8) and (9).
- Put clampblocks (141) in position.
- Install bolt (146) and washer (145).
- Install the two bolts (139) and washers (140).
- Tighten bolts (139) and (146) and safety them with lockwire (Material No. 19-010).

4 Install clampblocks at RIB10.
- Install new bushings (132) and (138) on tubes (8) and (9).
- Put clampblocks (137) in position.
- Install bolt (134) and washer (133).



Clampblocks Removal/Installation (Forward Section)
Figure 406

- Install bolt (135) and washer (136).
- Install the two nuts (131) and tighten them.
- Safety bolts (134) and (135) with lockwire (Material No. 19-010).

(e)Connect bonding leads at RIB7.
(Ref. Fig. 405)

1 Install clamp (124) on tube (9).
- Install bolt (123), washer (126) and connect bonding leads (128) and (125).
- Install nut (127) and tighten it.

2 Install clamp (121) on tube (8).
- Install bolt (122), washer (118) and connect bonding leads (120) and (119).
- Install nut (117) and tighten it.

3 Install clamp (115) on tube (1).
- Install bolt (116), washer (113) and connect bonding leads (111) and (114).
- Install nut (112) and tighten it.

(f)Install bulkhead unit and clampblocks at RIB12 (center section).
(Ref. Fig. 404)

1 Install bulkhead unit at RIB12.
- Assemble the ten spacers (84) with the three parts of plate (83) and the two half-collars (82).
- Install the ten nuts (81) and tighten them.
- Assemble the two half-collars (85) and the two brackets (86) and (101).
- Install the ten nuts (88) and tighten them.

2 Install clampblocks at RIB12.
- Install new bushings (91), (93) and (94) on tubes (1), (8) and (9).
- Put clampblocks (99) in position.
- Install bolt (90) and washer (89). Assemble with bracket (86) and install nut (87).
- Install bolt (96), washer (95) and nut (92).
- Install bolt (97) and washer (98). Assemble with bracket (101) and install nut (100).
- Tighten nuts (87), (92) and (100).
- Safety bolts (90), (96) and (97) with lockwire (Material No. 19-010).

(2)Install case drain and pressure tubes (aft parts) and install suction tube clampblocks (rear section).
(Ref. Fig. 402, 403)

(a)Put in position case drain tube (16) from the rear.
(b)Put in position pressure tube (22) from the rear.
(c)Install clampblocks (rear section).
(Ref. Fig. 403)

1 Install clampblocks at RIB18.
- Install new bushings (41), (51) and (52) on tubes (1), (22) and (16).
- Put clampblocks (46) in position.
- Install bolt (49) and washer (50).
- Install the two bolts (48) and washers (47).
- Install spacers (45), (43) and (54) and nuts (44), (42) and (53).

Tighten nuts.
- Safety bolts (48) and (49) with lockwire (Material No. 19-010).

2 Install clampblocks at RIB16.
- Install new bushings (62) and (61) on tubes (22) and (16).
- Put clampblocks (60) in position.
- Install bolt (57) and washer (56).
- Install bolt (58) and washer (59).
- Install the two nuts (55) and tighten them.
- Safety bolts (57) and (58) with lockwire (Material No. 19-010).

3 Install half-blocks at RIB15.
- Install new bushing (65) on tube (22).
- Put half-blocks (66) in position.
- Install the two bolts (63) and washers (64).
- Tighten bolts (63) and safety them with lockwire (Material No. 19-010).

4 Install clamps at RIB13-14.
- Install new bushings (26) and (36) on tube (1).
- Put clamp (31) in position.
- Install bolt (27), washer (28), spacer (29) and nut (30).
- Tighten nut (30).
- Put clamp (33) in position.
- Install bolt (35), washer (34) and nut (32).
- Tighten nut (32).

5 Install clampblocks at RIB13 and RIB14.
- Install new bushings (79) and (70) on tubes (1) and (16).
- Install new bushings (73) and (72) on tubes (1) and (9).
- Put clampblocks (40) and (78) in position.
- Install bolt (69) and washer (68).
- Install bolt (75) and washer (74).
- Put cover (37) in position.
- Install the two bolts (38) and washers (39).
- Install the two bolts (76) and washers (77).
- Install nuts (67) and (71) and tighten them.
- Safety bolts (38) and (69) with lockwire (Material No. 19-010).
- Safety bolts (76) and (75) with lockwire (Material No. 19-010).

(d)Connect case drain and pressure tubes at RIB13-14.
(Ref. Fig. 402)

1 Put manifold (19) in position.

2 Connect pressure tube (22) to union (20). Position nut (21) with special wrench 98A54003120200 and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

3 Connect pressure tube (8) to union (18). Position nut (17) with special wrench 98A54003119200 and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

4 Connect hose (25) to union (23). Position tube end-fitting (24) to union (23) and TORQUE to between 132 and 150 lbf.in. (1.5 and 1.7 m.daN).

5 Put check valve (14) in position.

6 Connect case drain tube (16) to check valve (14). Position tube end-fitting (15) and TORQUE to between 141 and 150 lbf.in. (1.6 and 1.7 m.daN).

7 Connect case drain tube (9) to check valve (14). Position tube end-fitting (13) and TORQUE to between 141 and 150 lbf.in. (1.6 and 1.7 m.daN).

(3)Connect tubes at the pylon/hydraulic junction box interface. (Ref. Fig. 401)

CAUTION : USE A SECOND WRENCH TO APPLY COUNTERTORQUE TO THE NIPPLE WHEN YOU DISCONNECT/CONNECT HYDRAULIC TUBES ON NIPPLES.

(a)Connect case drain tube (9).

1 Install washer (10) and nut (11).

2 Position case drain tube end-fitting (12) and TORQUE to between 256 and 283 lbf.in. (2.9 and 3.2 m.daN).

3 TORQUE nut (11) to 256 lbf.in. (2.9 m.daN). Safety nut (11) with lockwire (Material No. 19-010).

(b)Connect pressure tube (8).

1 Install washer (7) and nut (6).

2 Position pressure tube end-fitting (5) and TORQUE to between 1141 and 1256 lbf.in. (12.9 and 14.2 m.daN).

3 TORQUE nut (6) to 1141 lbf.in. (12.9 m.daN). Safety nut (6) with lockwire (Material No. 19-010).

(c)Connect suction tube (1).

1 Install washer (2) and nut (3).

2 Position suction tube end-fitting (4) and TORQUE to between 1398 and 1601 lbf.in. (15.8 and 18.1 m.daN).

3 TORQUE nut (3) to 1398 lbf.in. (15.8 m.daN). Safety nut (3) with lockwire (Material No. 19-010).

(4)Install bleed air precooler cold air inlet duct (Ref. 36-11-00, P. Block 401).

(5)Install bleed air precooler (Ref. 36-11-15, P. Block 401).

(6)Install aft fairing (Ref. 54-54-00, P. Block 401).

D. Test

(1)Remove safety clips and tags and close the following circuit breakers :

(a)For Engine 1 Blue Pump :
- 5GD, 31GJ, 101GK and 1GL.

(b)For Engine 2 Yellow Pump :
- 1GD, 5GD, 103GK and 6GL.

(2)Remove warning notices.

(3)On panel 20VU, push ENG1 FIRE and ENG2 FIRE handles.

(4)On HYD PWR section of panel 471VU, check that the fire valves are open. OPEN legends of FIRE VALVES annunciators are on.

(5)Pressurize associated hydraulic system reservoir (Ref. 29-14-00, P. Block 301).

(6)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(7)On ECAM control panel, press HYD pushbutton switch and on panel 427VU, make certain that corresponding ENG PUMP pushbutton switch is pressed (in).

(8)Dry-motor the engine (Ref. 71-00-00, P. Block 501).

(9)Check connections for leakage.

(10)On right ECAM display unit, check that pressure reading is 3000 ± 200 psi (206 ± 13.5 bars) for corresponding hydraulic

system.

(11)On overhead panel 427VU, release the corresponding ENG PUMP pushbutton switch (the OFF legend comes on). On right ECAM display unit, check that pressure reading drops to 0 psi (0 bar) for the corresponding hydraulic system.

(12)Stop dry-motoring engine.

(13)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).

E. Close-up

(1)Remove containers and make certain that working areas are clean and clear of tools and miscellaneous items of equipment.

(2)Install access panels.

(3)Remove access platforms.

(4)Close thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

YELLOW MAIN HYDRAULIC POWER - DESCRIPTION AND OPERATION

1. General

The Yellow hydraulic system allows :

- Operation of the control surfaces even with inflight engine failure, by means of the ram air turbine
- Alternate braking and parking
- On ground, operation of the cargo compartment doors.

The three functions above correspond to three sections of the HP manifold.

A. The flight controls section receives pressure, through the servo controls manifold, from engine 2 pump, the RAT and the ground connector.
It can be pressurized directly through a filter by the Green/Yellow power transfer unit.
It supplies the flap power control unit Yellow hydraulic motor through a priority valve and includes the same components as the other HP manifolds.

B. The monitoring section is supplied by the other two sections through two check valves and includes two brake Yellow power accumulators, similar to but of a larger capacity than the hydraulic system power accumulators, a pressure transmitter, and a brake Yellow pressure relief valve with manual depressurization feature.

C. The cargo compartment door section is supplied by the Yellow electric pump through a filter and a check valve. The forward and aft compartment doors are operated separately through the associated electro-mechanical selector valves on the manifold or by means of the hand pump connected at the outlet of the selector valves. The hand pump cannot by used for repressurizing the brake accumulators.

2. Component Location
(Ref. Fig. 001)
(Ref. Fig. 002)

**ON A/C 001-100,

(Ref. Fig. 003)

**ON A/C 101-200,

(Ref. Fig. 004)

**ON A/C 001-100,

(Ref. Fig. 005)

**ON A/C 101-200,

(Ref. Fig. 006)
(Ref. Fig. 007)

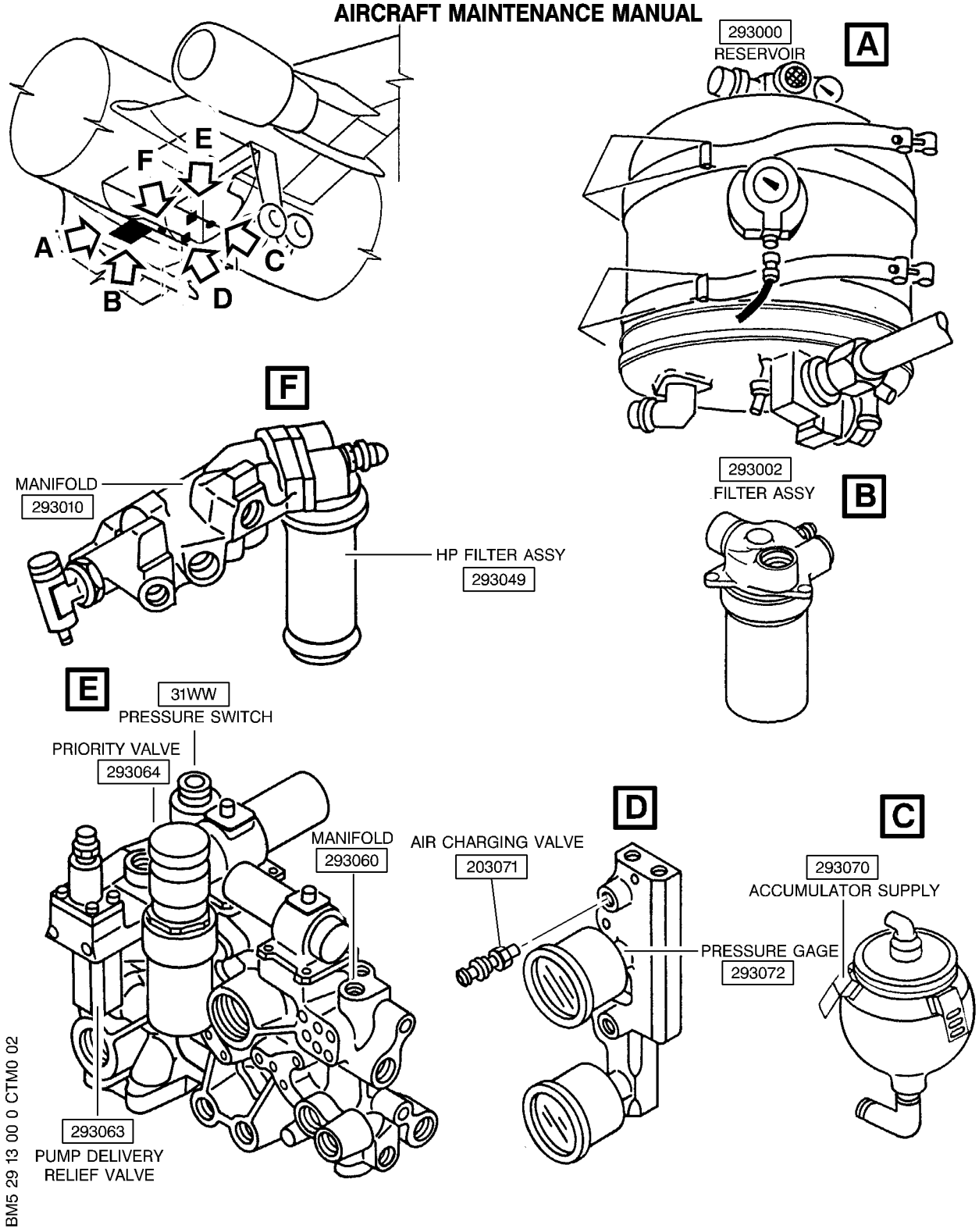
**ON A/C ALL

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	293000	RESERVOIR-HYDRAULIC, YELLOW		671	671BB	29-11-11
	293002	FILTER-RSVR RETURN, YELLOW		671	671BB	29-11-15
	293005	VALVE-DEPRESS/RELIEF, Y RSVR		671	671BB	29-13-19
	293006	GROUND CONNECTOR-DELIVERY, Y		671	671DB	29-13-21
	293008	GROUND CONNECTOR-SUCTION, Y		671	671DB	29-13-23
	293010	MANIFOLD-SERVO CONTROLS, Y		148	734	29-13-34
	293031	PUMP-YELLOW, ENG 2		445	445AL	29-11-32
	293042	VALVE-NON RETURN		420		
	293049	FILTER-Y PUMP DELIVERY, ENG 2		148	734	29-11-42
	293060	MANIFOLD-HP, YELLOW		148	734	29-12-12
	293063	RELIEF VALVE-YELLOW PUMP DELIVERY		148	734	29-13-55
	293064	PRIORITY VALVE-YELLOW		148	734	27-14-14
	293070	ACCU-YELLOW PWR		148	734	29-11-56
R	293071	AIR CHARGING VALVE		148	734	29-32-25
R	293072	PRESS GAGE-YELLOW ACCU		148	734	29-32-21
	2GD	VALVE-YELLOW, PUMP FIRE, ENG 2		675	675FB	29-11-33
	31WW	PRESS SWITCH-HP MANIFOLD, Y		148	734	
	6GD	PRESS SWITCH-Y PUMP, ENG 2		483	483AL	29-13-62

**ON A/C 001-100,

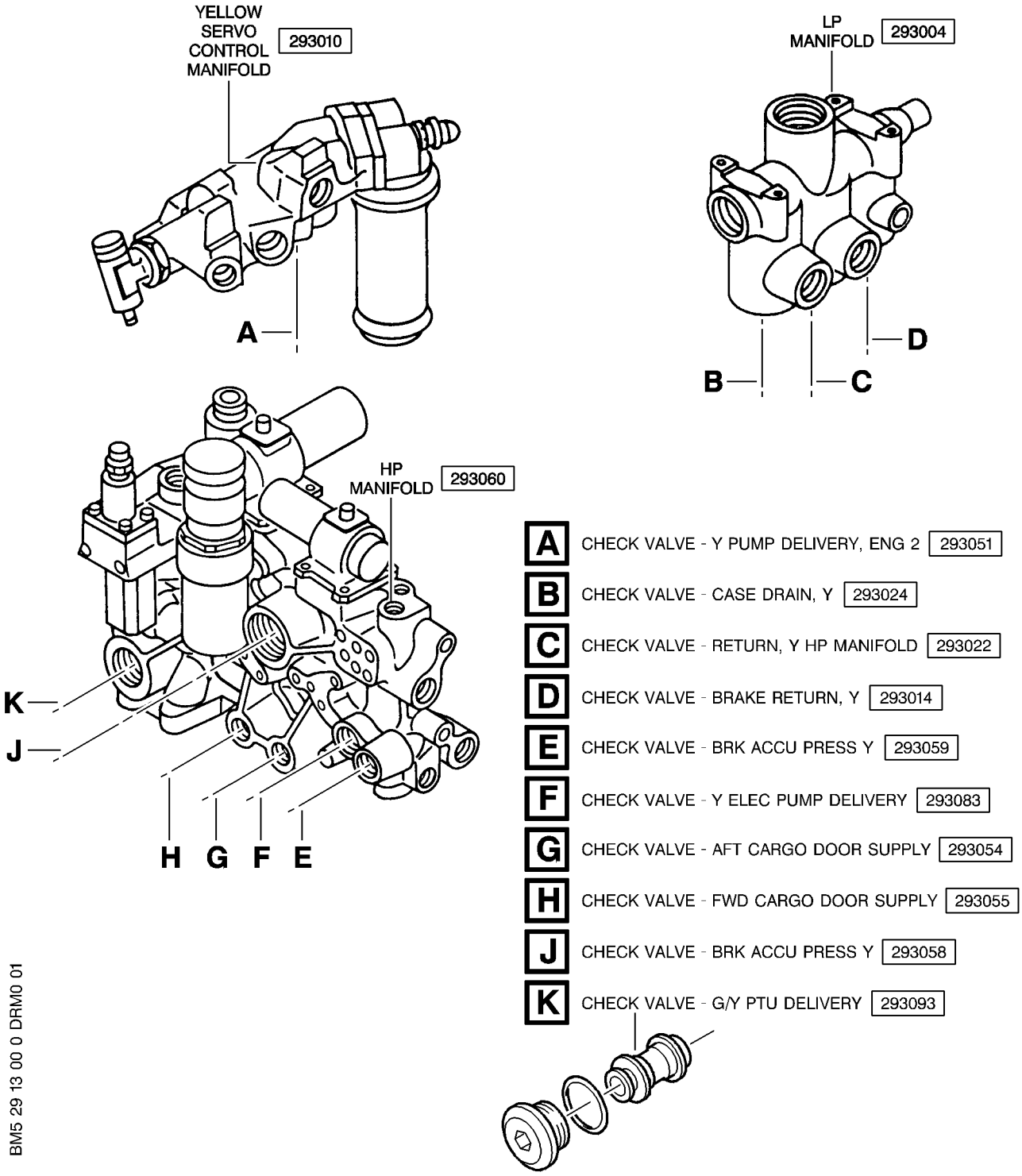
		FILTERS-ENGINE-DRIVEN PUMP CASE DRAIN		445	445AL	29-11-36

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	**ON A/C 101-200,					
		FILTERS-ENG PUMP CASE DRAIN	462	462AR		29-11-36
	**ON A/C ALL					
R	293087	VALVE-MANUAL DEPRESS, Y RSVR	671	671BB		
	293014	CHECK VALVE-BRAKE RETURN, Y	148	734		29-13-16
	293022	CHECK VALVE-RETURN, Y HP MANIFOLD	148	734		29-13-16
	293024	CHECK VALVE-CASE DRAIN, Y	148	734		29-13-16
	293051	CHECK VALVE-Y PUMP DELIVERY, ENG 2	148	734		29-13-34
	293054	CHECK VALVE-AFT CARGO DOOR SUPPLY	148	734		29-13-12
	293055	CHECK VALVE-FWD CARGO DOOR SUPPLY	148	734		29-13-12
	293058	CHECK VALVE-BRK ACCU PRESS Y	148	734		29-13-12
	293059	CHECK VALVE-BRK ACCU PRESS Y	148	734		29-13-12
	293083	CHECK VALVE-Y ELEC PUMP DELIVERY	148	734		29-13-12
	293093	CHECK VALVE-G/Y PTU DELIVERY	148	734		29-13-12

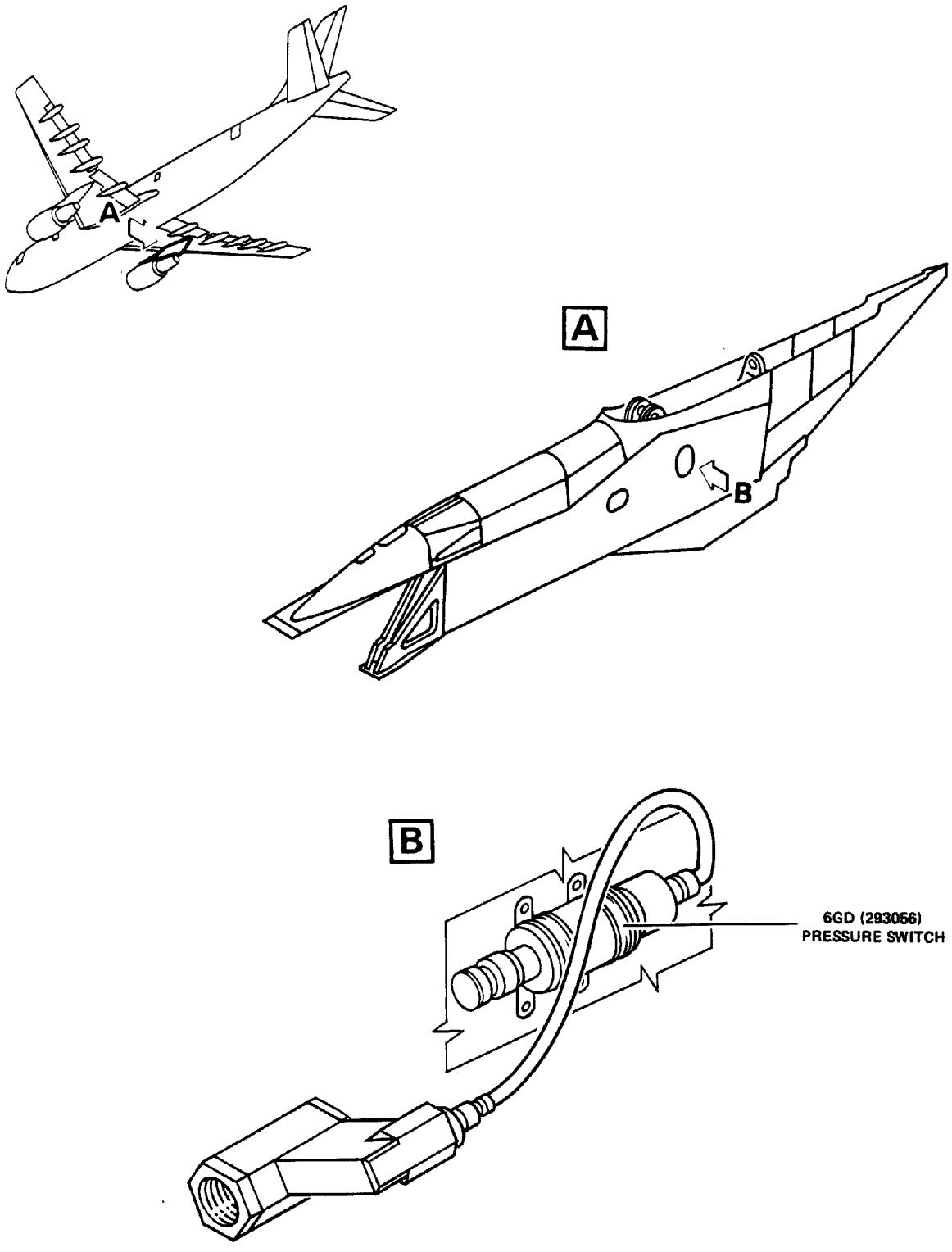


Component Location
Figure 001

R

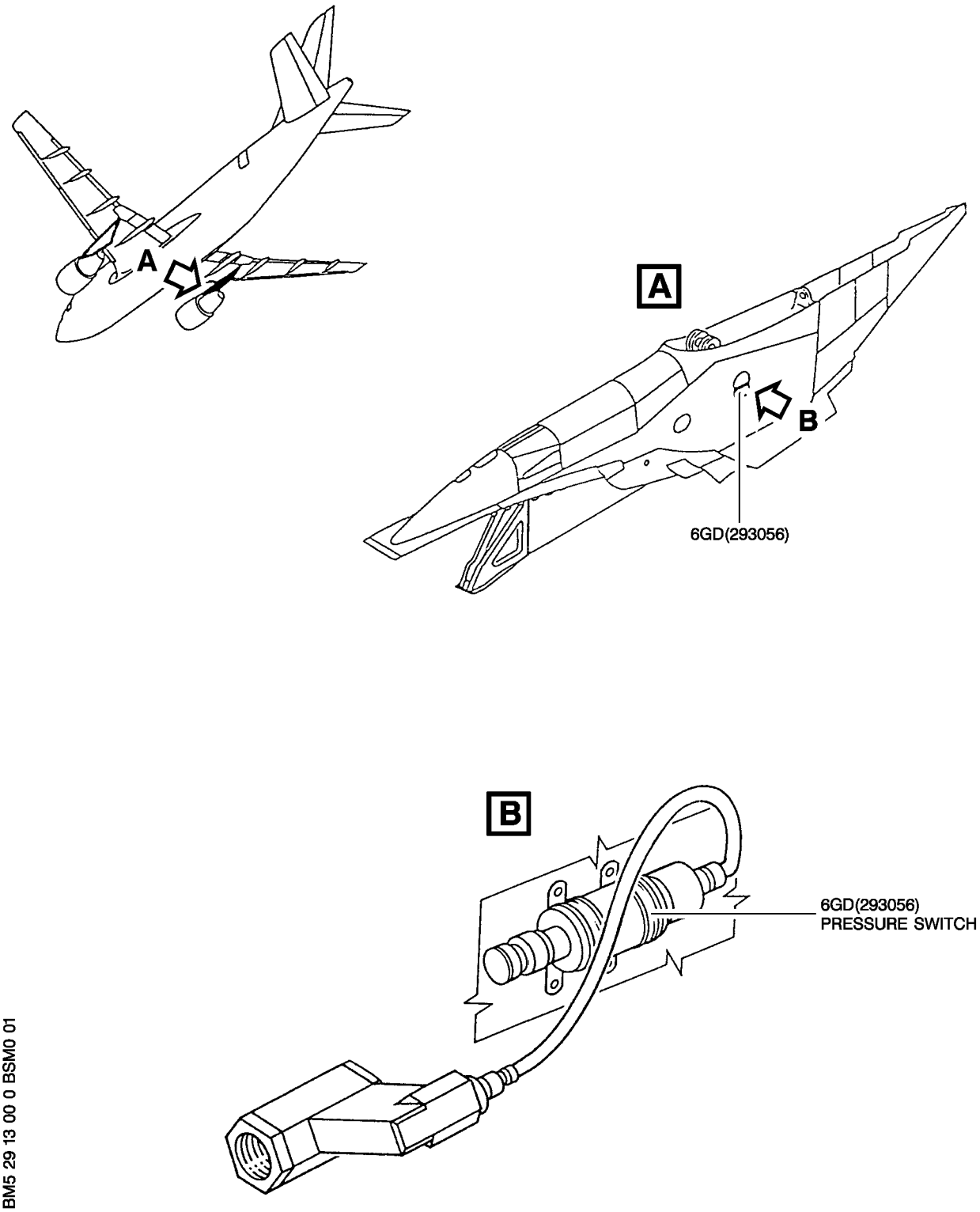

YELLOW SERVO CONTROL MANIFOLD 293010
A
LP MANIFOLD 293004
B
C
D
HP MANIFOLD 293060
K
J
H
G
F
E
A CHECK VALVE - Y PUMP DELIVERY, ENG 2 293051
B CHECK VALVE - CASE DRAIN, Y 293024
C CHECK VALVE - RETURN, Y HP MANIFOLD 293022
D CHECK VALVE - BRAKE RETURN, Y 293014
E CHECK VALVE - BRK ACCU PRESS Y 293059
F CHECK VALVE - Y ELEC PUMP DELIVERY 293083
G CHECK VALVE - AFT CARGO DOOR SUPPLY 293054
H CHECK VALVE - FWD CARGO DOOR SUPPLY 293055
J CHECK VALVE - BRK ACCU PRESS Y 293058
K CHECK VALVE - G/Y PTU DELIVERY 293093
BM5 29 13 00 0 DRM0 01

Component Location
Figure 002



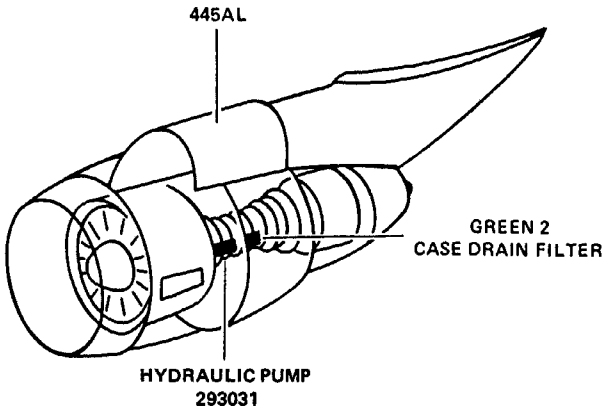
BM5 29 13 00 0 DYM0 – 00

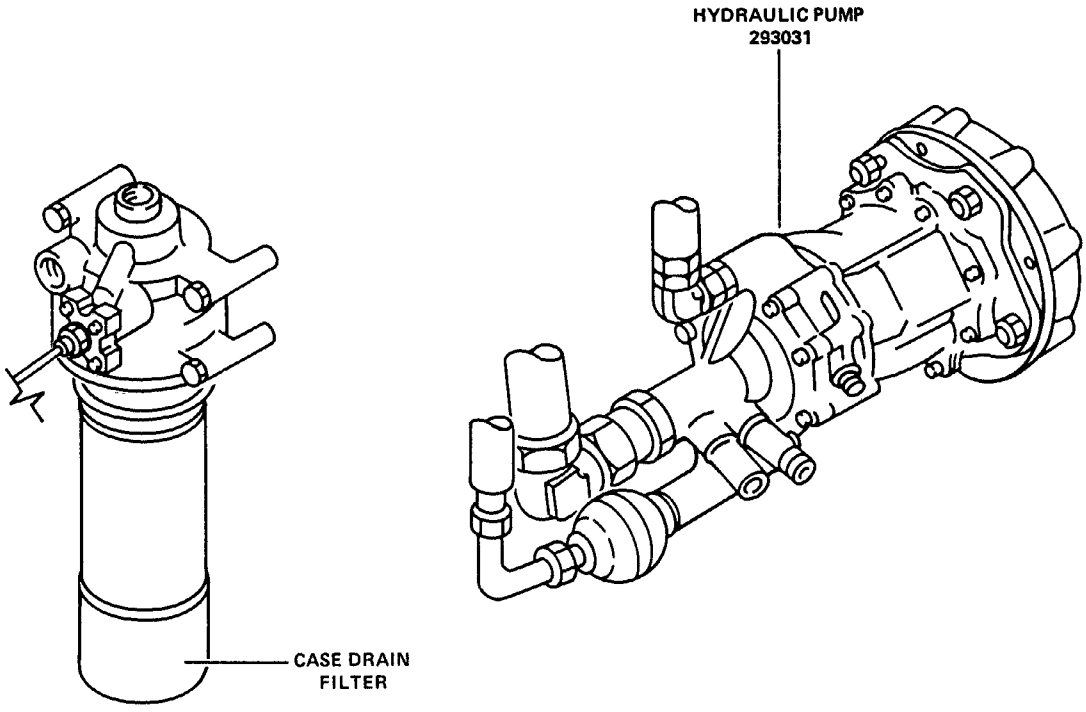
Component Location
Figure 003



BM5 29 13 00 0 BSM0 01

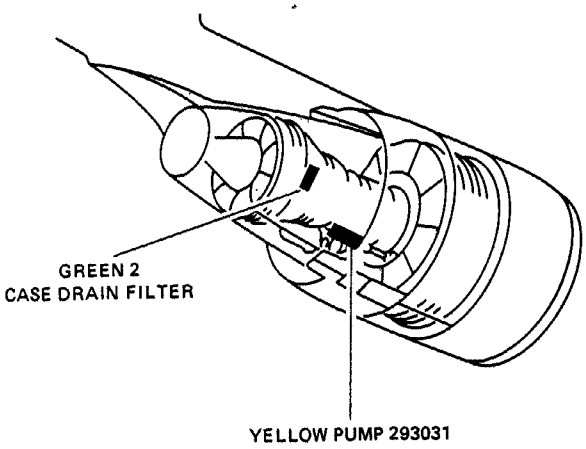
Component Location
Figure 004

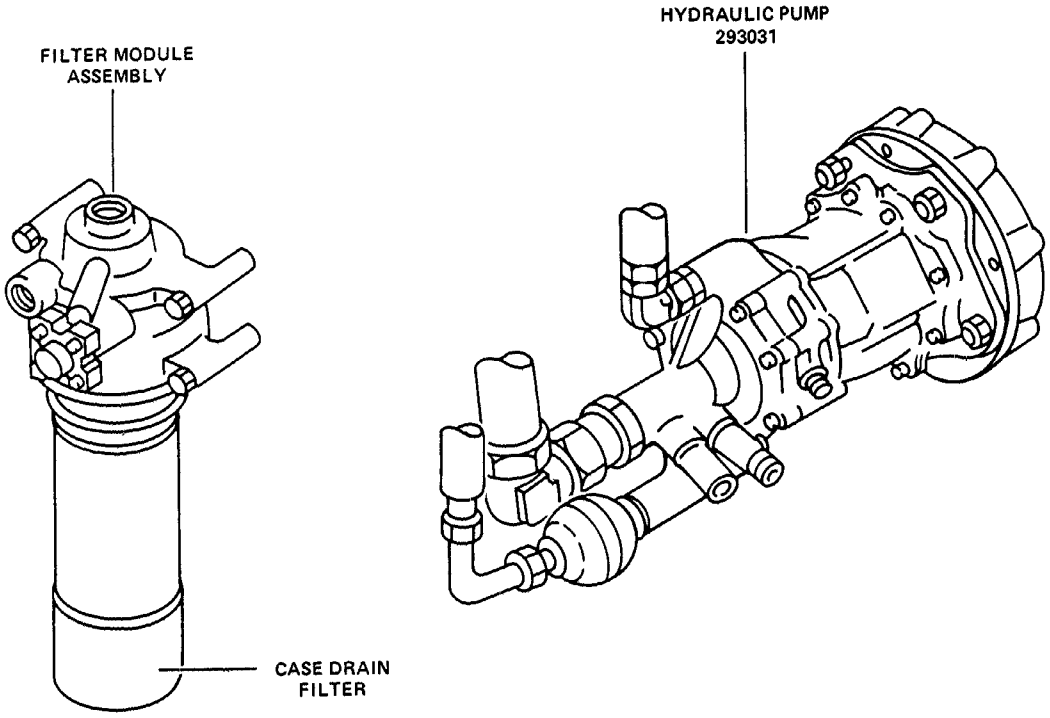




BM5 29 13 00 0 BXM0 – 21

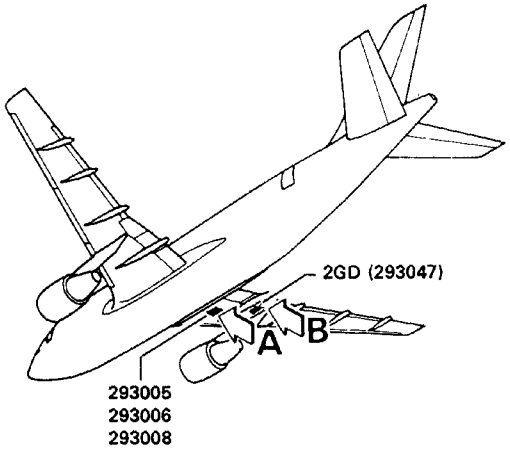
Component Location
Figure 005

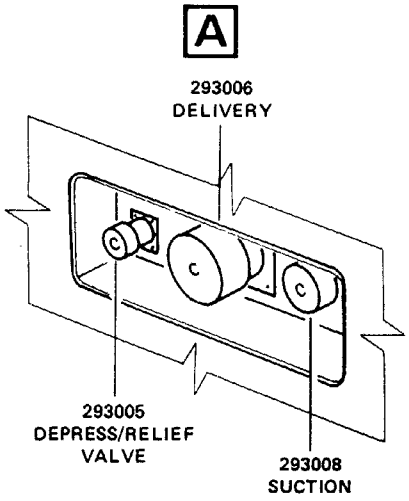


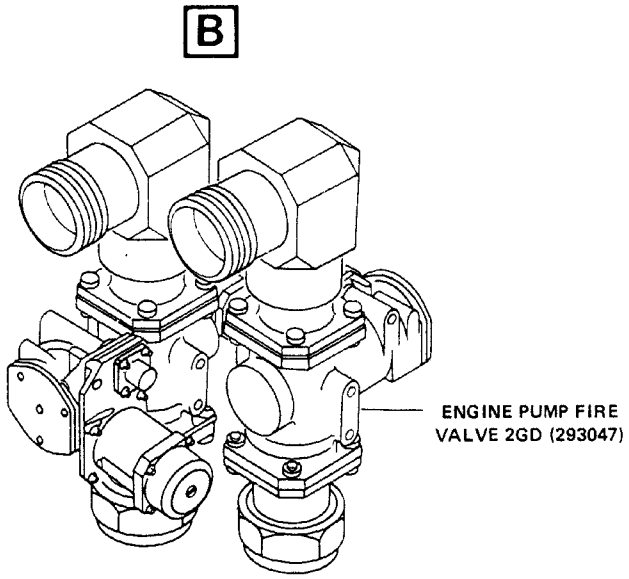


BM5 29 13 00 0 BGM0 – 01/28

Component Location
Figure 006







BM5 29 13 00 0 BUM0 – 00

Component Location
Figure 007

3. Users

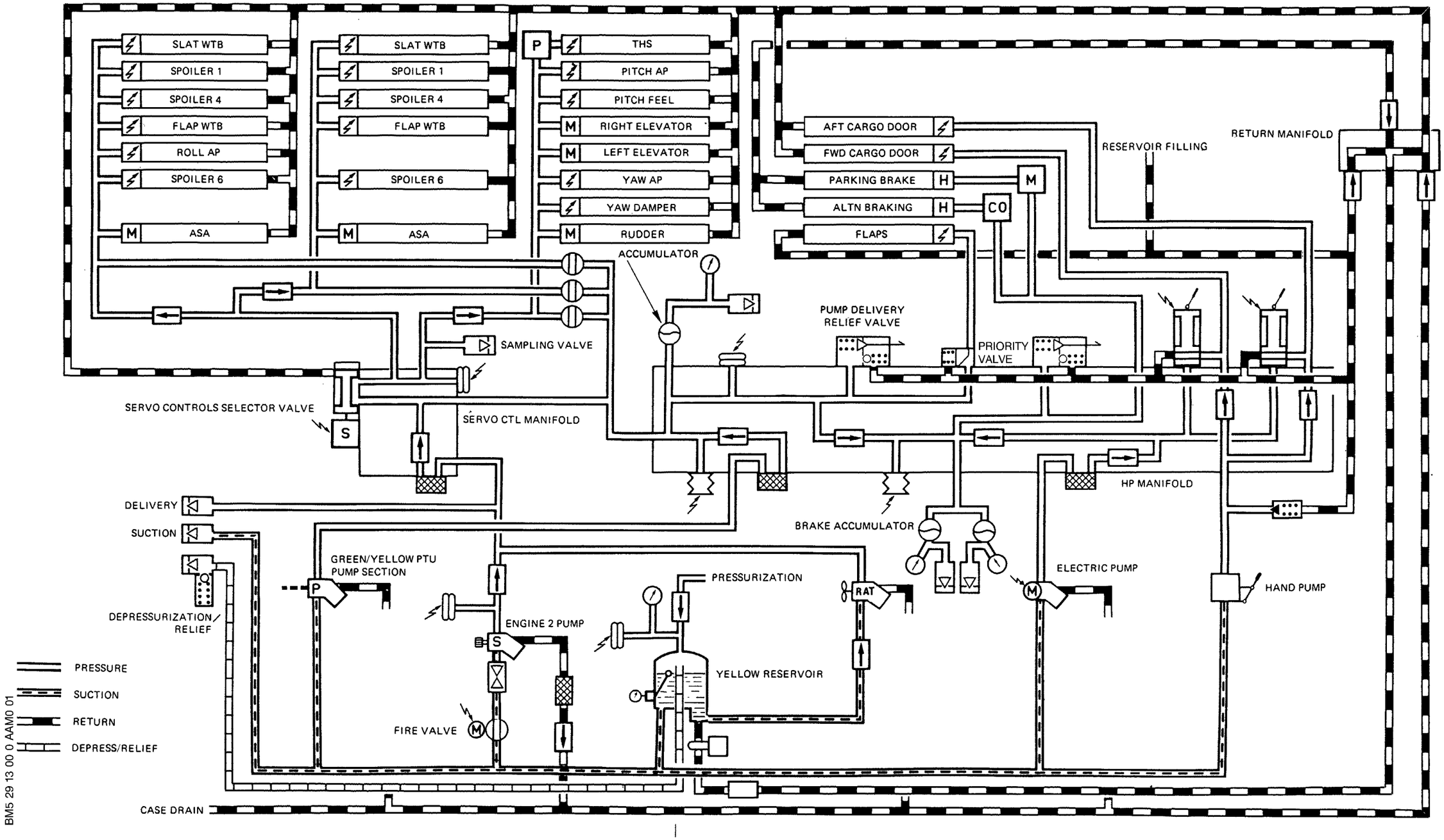
(Ref. Fig. 008)
(Ref. Fig. 009)
(Ref. Fig. 010)
(Ref. Fig. 011)

A. Supplied through the servo controls manifold (or through wing aft fuselage isolation valves) :
- Two all speed aileron servo controls, L and R
- Two elevator servo controls, L and R
- One rudder servo control
- Six actuators on spoilers 1, 4 and 6, L and R

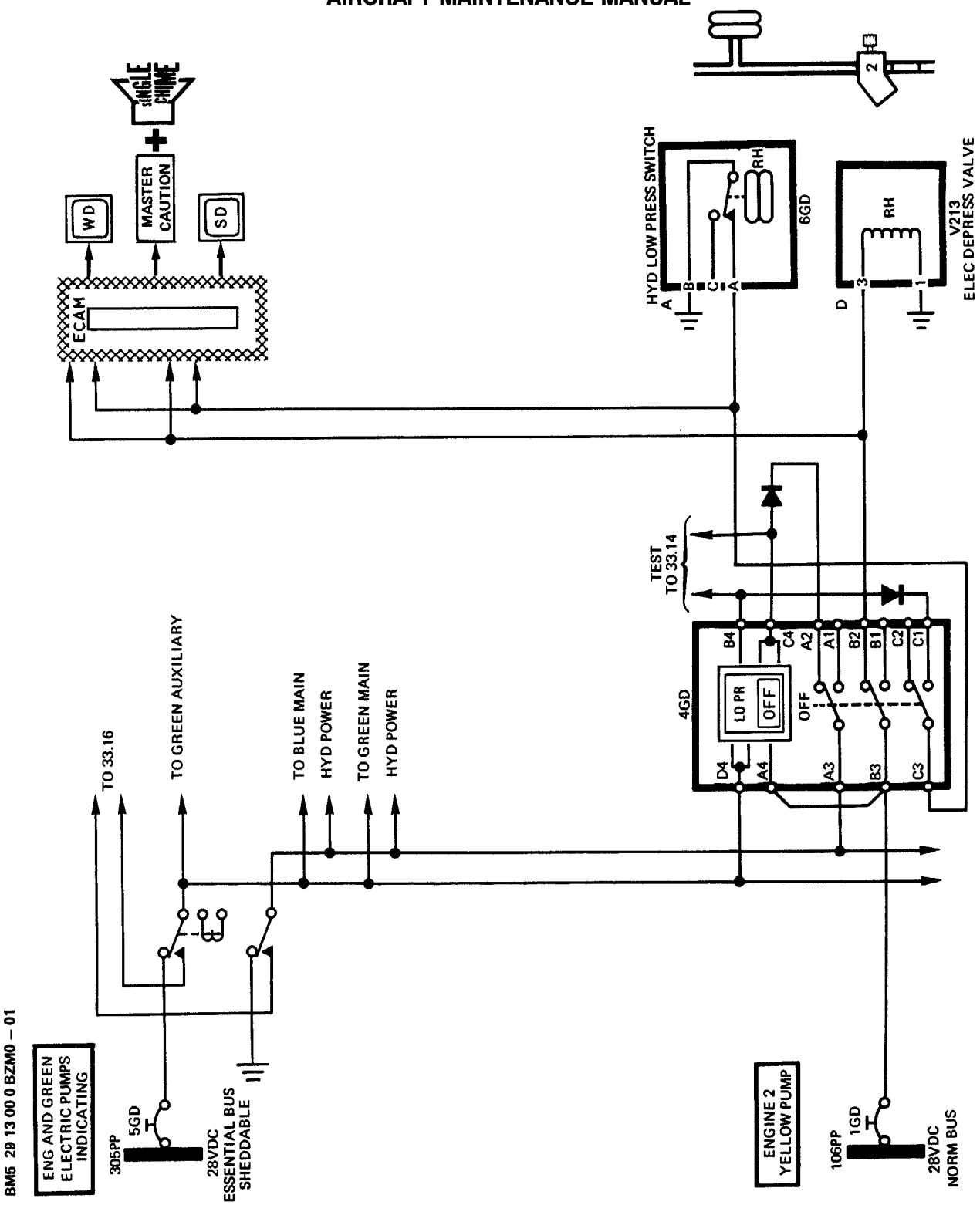
- Four L and R slat and flap wing tip brake pistons
- One trimmable horizontal stabilizer actuator motor
- One autopilot pitch actuator servomotor
- One autopilot yaw actuator servomotor
- One autopilot roll actuator servomotor
- One pitch artificial feel unit actuator
- One yaw damper actuator servomotor.

B. Supplied through the HP manifold
- One flap power control unit motor, via a priority valve
- Yellow braking system - alternate and parking
- Two forward and aft cargo compartment door actuators.

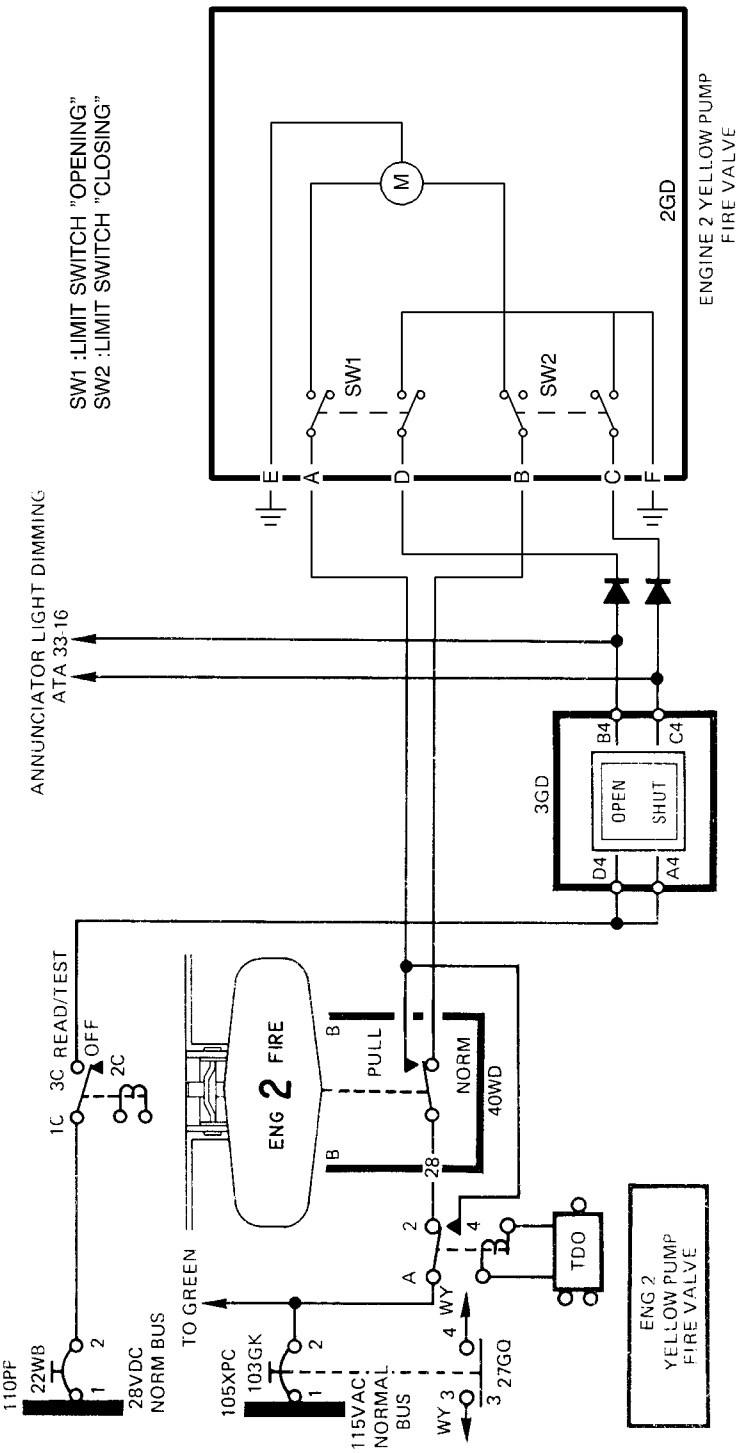
INTENTIONALLY BLANK



Yellow Hydraulic Power System
Figure 008

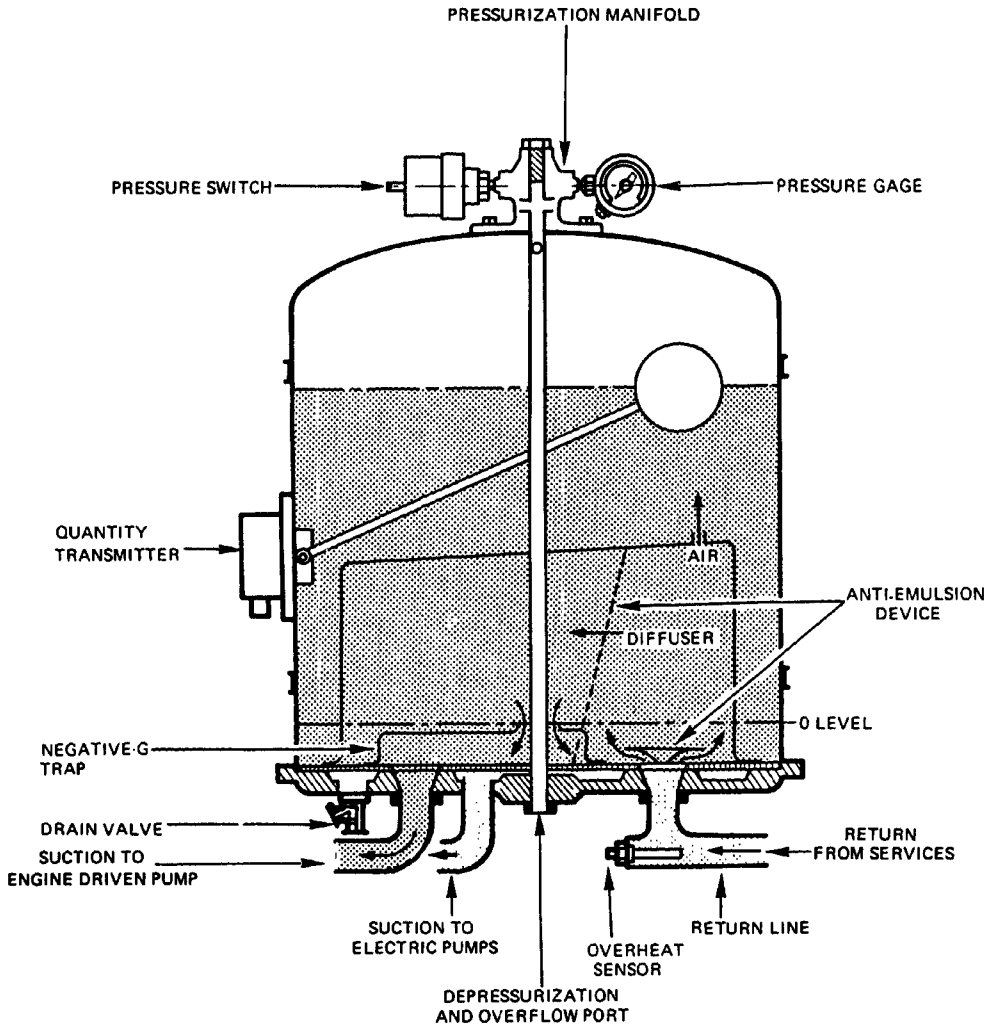


Yellow Engine Pump Control and Monitoring
Figure 009



BM5 29 13 00 0 CAM0 01

Yellow Pump Fire Valve
Figure 010



8M5 29 13 00 0 DAMO – 09

Yellow System Hydraulic Reservoir
Figure 011

MANIFOLD - HP, YELLOW
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Caps/Plugs
(2)	Circuit Breaker(s) Safety Clip(s)
(3)	Container
(4)	Warning Notices
(5)	Access Platform 2.6 m (8 ft. 8 in.)
(6)	Lockwire
(7)	Safety Barriers
(8)98A52307523000	Support Struts - FWD and Aft Cargo Compartment Doors
(9)97A29102090000	Bobbin and Ring Installation Tool
(10)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
(11)Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
R - 20-23-12, P. Block 1	Specified Torque Values for Unions
- 20-23-21, P. Block 1	Hydraulic Bobbins
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (FLAPS)
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-11-55, P. Block 601	Pumps Delivery Relief Valve
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 29-23-11, P. Block 401	Green/Yellow Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)
- 32-43-00, P. Block 501	Alternate Braking with Anti Skid
- 52-33-00, P. Block 1	Cargo Compartment Door
- 52-33-00, P. Block 301	Cargo Compartment Door Hydraulic System

2. Procedure

A. Job Set-Up
(1)On overhead panel 427VU in flight compartment :

(a)Make certain that electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).
(b)Display a warning notice prohibiting pressurization and use of Green hydraulic system.

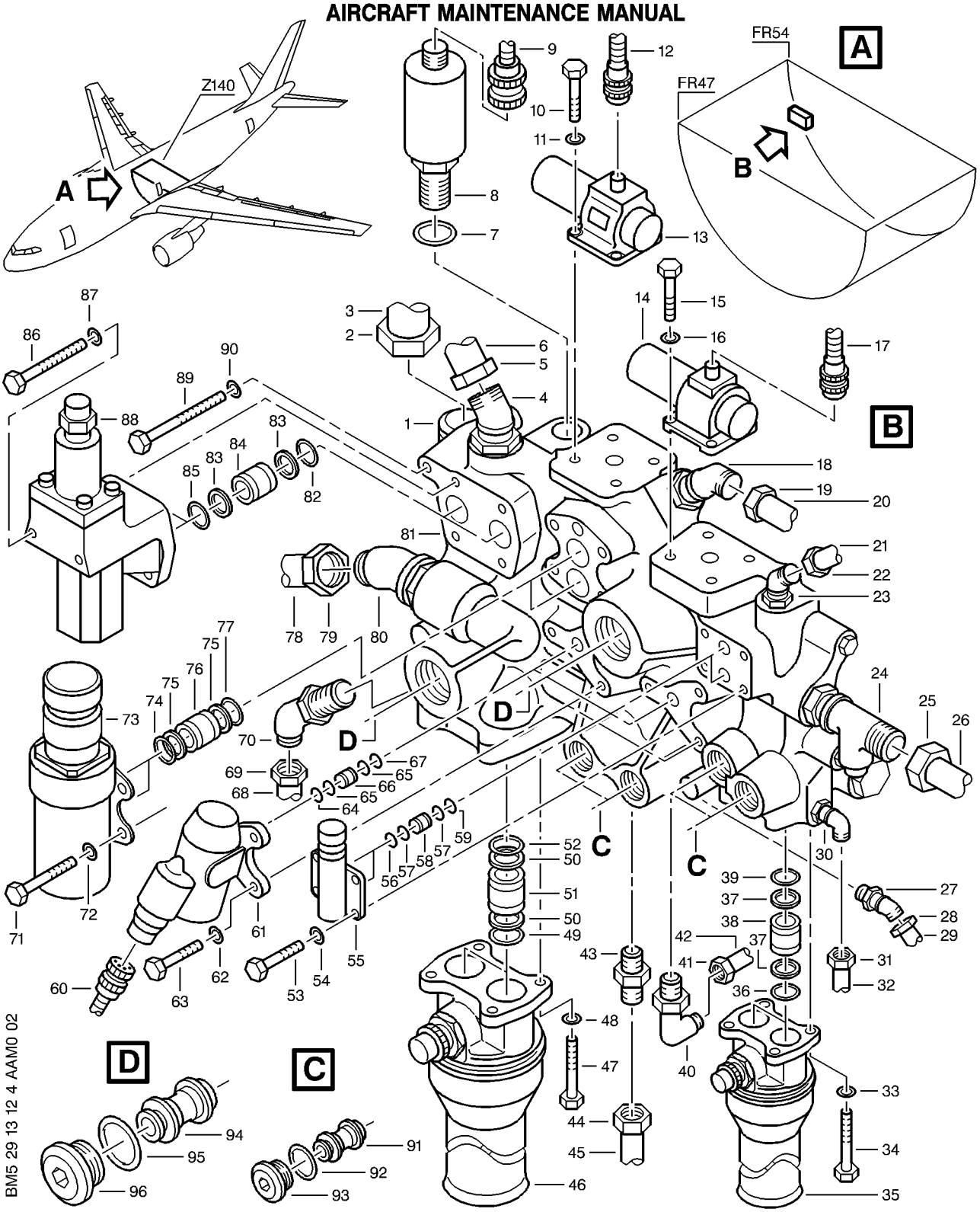
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL &/CARGO DOOR PUMP	7GX	333/T51
101VU	ELEC HYD PUMP	23GX	GEN2/B5

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Open cargo compartment doors (Ref. 52-33-00, P. Block 1) and install cargo compartment support struts (98A52307523000).
(6)Install access platform at zone 140.
(7)Depressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(8)Depressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(9)Place container under reservoir to be drained and place absorbent material around unions.
(10)Drain Yellow hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(11)Disconnect isolation coupling of Power Transfer Unit (PTU) (Ref. 29-23-11, P. Block 401).

B. Removal
(Ref. Fig. 401)

(1)Disconnect electrical connectors (9) (17) (12) and (60) (two connectors).
(2)Put blanking caps on disconnected electrical connectors.
(3)Loosen pipe end-fitting (2) and disconnect pipe (3) from elbow union (1).
(4)Loosen pipe end-fitting (5) and disconnect pipe (6) from elbow union (4).
(5)Loosen pipe end-fitting (19) and disconnect pipe (20) from elbow union (18).
(6)Loosen pipe end-fitting (22) and disconnect pipe (21) from elbow union (23).
(7)Loosen pipe end-fitting (28) and disconnect pipe (29) from elbow union (27).
(8)Loosen pipe end-fitting (31) and disconnect pipe (32) from elbow union (30).
(9)Loosen pipe end-fitting (41) and disconnect pipe (42) from elbow union (40).
(10)Loosen pipe end-fitting (25) and disconnect pipe (26) from union (24).
(11)Loosen pipe end-fitting (44) and disconnect pipe (45) from union (43).
(12)Loosen pipe end-fitting (69) and disconnect pipe (68) from elbow union (70).
(13)Loosen pipe end-fitting (79) and disconnect pipe (78) from elbow union (80).



Yellow HP Manifold
Figure 401

R

(14)Hold manifold (81) and remove bolts (89), washers (90). Remove manifold (81).
(11)Install blanking plugs on disconnected line ends and manifold ports.

C. Preparation of Replacement Component

CAUTION : WHEN REMOVING THE BOBBINS, GREAT CARE SHOULD BE TAKEN NOT TO DAMAGE THEM. IT IS RECOMMENDED TO USE SPECIAL TOOL 97A29102090000.

(1)Remove parts which are attached to removed HP manifold.

R NOTE : Put non-return valves, unions and plugs into plastic bags to keep
R them clean.

(a)Remove HP filter (35).
1 Cut, remove and discard lockwire.
2 Remove bolts (34), washers (33) and remove HP filter.
3 Remove and discard seals (39), packings (36) and O-rings (37) from bobbins (38) (Ref. 20-23-21, P. Block 1).
(b)Remove pressure switch (8) and retain packing (7).
(c)Remove priority valve (73).
1 Cut, remove and discard lockwire.
2 Remove bolts (71), washers (72) and remove HP filter.
3 Remove and discard seals (75), packings (74) and O-rings (75) from bobbins (76) (Ref. 20-23-21, P. Block 1).
(d)Remove relief valve assy (88).
1 Cut, remove and discard lockwire.
2 Remove bolts (86), washers (87) and remove relief valve assy.
3 Remove and discard seals (82), packings (85) and O-rings (83) from bobbins (84) (Ref. 20-23-21, P. Block 1).
(e)Remove hydraulic selector valve (61).
1 Cut, remove and discard lockwire.
2 Remove bolts (63), washers (62) and remove hydraulic selector valve.
3 Remove and discard seals (67), packings (64) and O-rings (65) from bobbins (66) (Ref. 20-23-21, P. Block 1).
(f)Remove HP filter (46).
1 Cut, remove and discard lockwire.
2 Remove bolts (47), washers (48) and remove HP filter.
3 Remove and discard seals (52), packings (49) and O-rings (50) from bobbins (51) (Ref. 20-23-21, P. Block 1).
(g)Remove the two thermal relief valves (55).
1 Cut, remove and discard lockwire.
2 Remove bolts (53), washers (54) and remove the two thermal relief valves.
3 Remove and discard seals (59), packings (56) and O-rings (57) from bobbins (58) (Ref. 20-23-21, P. Block 1).
(h)Remove hydraulic pressure transmitter (13).
1 Cut, remove and discard lockwire.
2 Remove bolts (10), washers (11) and remove hydraulic pressure transmitter.
(j)Remove hydraulic pressure transmitter (14).
1 Cut, remove and discard lockwire.
2 Remove bolts (15), washers (16) and remove hydraulic pressure transmitter.

(k)Put bobbins (38) (51) (58) (66) (76) (84) into plastic bags to keep them clean.
(l)Install blanking plugs in open ports of all removed components.
(m)Remove union (43) from manifold (81) and discard O-ring.
(n)Remove elbow union (40) from manifold (81) and discard O-ring.
(p)Remove elbow union (27) from manifold (81) and discard O-ring.
Remove elbow union (24) from manifold (81) and discard O-ring.
(q)Remove elbow union (23) from manifold (81) and discard O-ring.
(r)Remove elbow union (30) from manifold (81) and discard O-ring.
(s)Remove elbow union (18) from manifold (81) and discard O-ring.
(t)Remove elbow union (4) from manifold (81) and discard O-ring.
(u)Remove elbow union (1) from manifold (81) and discard O-ring.
(v)Remove elbow union (80) from manifold (81) and discard O-ring.
(w)Remove elbow union (70) from manifold (81) and discard O-ring.
(x)Remove non-return valves.
1 Cut, remove and discard lockwire.
2 Remove extractor plugs (93) and (96) from manifold (81) and discard O-rings (92) and (95).
3 Remove non-return valves (91) and (94) from manifold (81).
4 Install blanking plugs on manifold ports.

(2)Install removed parts on replacement manifold (81).
(Ref. Fig. 401)
(a)Remove blanking plugs from manifold (81) and components.
(b)Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.
R (c)Installation of non-return valves.
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE
R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Installation of non-return valves (91).
R - Put new O-rings (92) in position on extractor plugs (93).
R - Install extractor plugs (93) on non-return valves (91).
R - Install non-return valve/extractor plug assemblies on manifold (81).
R - TORQUE extractor plugs (93) to between 7.3 and 7.4 m.daN (645 and
R 655 lbf.in.) (Ref. 20-23-12, P. Block 1).
R 2 Installation of non-return valves (94).
R - Put new O-rings (95) in position on extractor plugs (96).
R - Install extractor plugs (96) on non-return valves (94).
R - Install non-return valve/extractor plug assemblies on manifold (81).
R - TORQUE extractor plugs (96) to between 9.7 and 10.7 m.daN (859 and
R 947 lbf.in.) (Ref. 20-23-12, P. Block 1).
3 Safety non-return valves with lockwire.
(d)Put O-ring in position on union (43).
Install and tighten union (43) on manifold (81).
(e)Put O-ring in position on elbow union (40).
Install and tighten elbow union (40) on manifold.
(f)Put O-ring in position on elbow union (27).
Install and tighten elbow union (27).
(g)Put O-ring in position on elbow union (24).
Install and tighten elbow union (24).
(h)Put O-ring in position on elbow union (23).

Install and tighten elbow union (23).
(j)Put O-ring in position on elbow union (30).
Install and tighten elbow union (30).
(k)Put O-ring in position on elbow union (18).
Install and tighten elbow union (18).
(l)Put O-ring in position on elbow union (4).
Install and tighten elbow union (4).
(m)Put O-ring in position on elbow union (1).
Install and tighten elbow union (1).
(n)Put O-ring in position on elbow union (80).
Install and tighten elbow union (80) on manifold (81).
(p)Put O-ring in position on elbow union (70).
Install and tighten elbow union (70).
NOTE : Make sure that you install the square-section seal on the end of the bobbin without the identification groove.
NOTE : Make sure that you install the bobbins so that the identification groove is in the manifold.
(q)Install HP filter (35).
1 Put new seals (39), packings (36) and O-rings (37) in position on bobbins (38).
2 Install bobbins (38) in ports of manifold (81) (Ref. 20-23-21, P. Block 1).
3 Install HP filter (35). Install bolts (34) and washers (33). Tighten bolts (34) and safety with lockwire.
(r)Install priority valve (73).
1 Put new seals (77), packings (74) and O-rings (75) in position on bobbins (76).
2 Install bobbins (76) in the ports of manifold (81) (Ref. 20-23-21, P. Block 1).
3 Install priority valve (73). Install bolts (71) and washers (72). Tighten bolts (71) and safety with lockwire.
(s)Install packing (7) and connect pressure switch (8).
(t)Install relief valve assy (88).
1 Put new seals (82), packings (85) and O-rings (83) in position on bobbins (84).
2 Install bobbins (84) in the ports of manifold (81) (Ref. 20-23-21, P. Block 1).
3 Install relief valve assy. Install bolts (86) and washers (87). Tighten bolts (86) and safety with lockwire.
(u)Install the two hydraulic selector valves (61).
1 Put new seals (67), packings (64) and O-rings (65) in position on bobbins (66).
2 Install bobbins (66) in the ports of manifold (Ref. 20-23-21, P. Block 1).
3 Install hydraulic selector valves (61). Install bolts (63) and washers (62).
Tighten bolts (63) and safety with lockwire.
(v)Install HP filter (46).
1 Put new seals (52), packings (49) and O-rings (50) in position bobbins (51).
2 Install bobbins (51) in the ports of manifold (81) (Ref. 20-23-21,

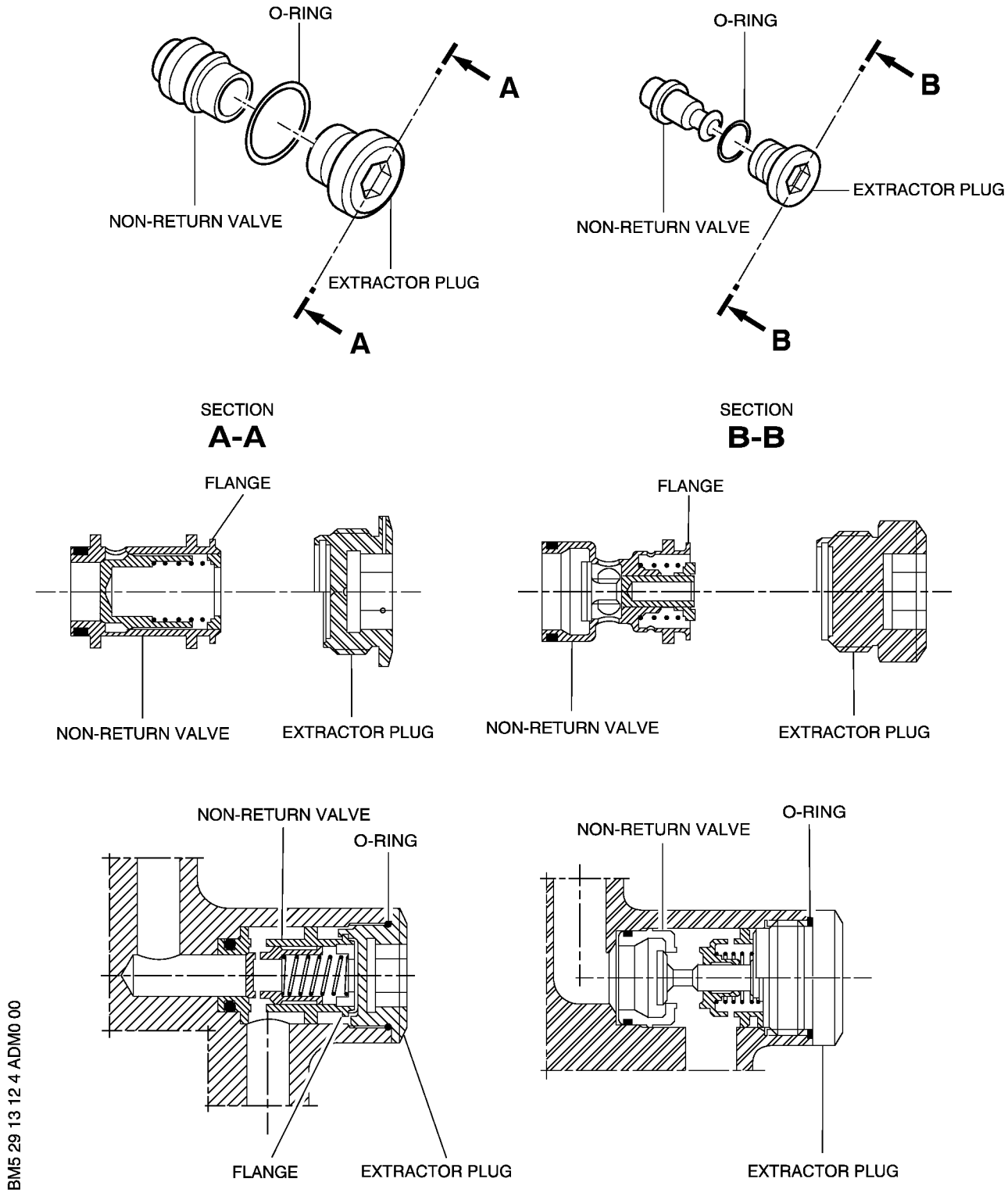
P. Block 1).
3 Install HP filter (46). Install bolts (47) and washers (48). Tighten bolts (47) and safety with lockwire.
(w)Install thermal relief valve (55).
1 Put new seals (59), packings (56) and O-rings (57) in position on bobbins (58).
2 Install bobbins (58) in the ports of manifold (81) (Ref. 20-23-21, P. Block 1).
3 Install thermal relief valve (55). Install bolts (53) and washers (54).
Tighten bolts (53) and safety with lockwire.
(x)Install hydraulic pressure transmitter (13).
Install bolts (10) and washers (11).
Tighten bolts (41) and safety with lockwire.
(y)Install hydraulic pressure transmitter (14).
Install bolts (15) and washers (16).
Tighten bolts (15) and safety with lockwire.

D. Installation
(Ref. Fig. 401)
(1)Remove sealant from contact surface of manifold (81) and aircraft structure with a plastic or wooden scraper.
(2)Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.
(3)Put manifold (81) in position on aircraft.
(a)Install bolts (89) and washers (90).
(b)Tighten bolts (89). Safety bolts (89) with lockwire.
(4)Apply a layer of SEALANTS (Material No. 09-018) to contact surface of manifold (81).
(5)Remove blanking plugs from pipe connections.
(6)Connect pipe (68) to elbow union (70). Tighten pipe end-fitting (69).
(7)Connect pipe (78) to elbow union (80). Tighten pipe end-fitting (79).
(8)Connect pipe (3) to elbow union (1). Tighten pipe end-fitting (2).
(9)Connect pipe (6) to elbow union (4). Tighten pipe end-fitting (5).
(10)Connect pipe (20) to elbow union (18). Tighten pipe end-fitting (19).
(11)Connect pipe (26) to union (24). Tighten pipe end-fitting (25).
(12)Connect pipe (45) to union (43). Tighten pipe end-fitting (44).
(13)Connect pipe (21) to elbow union (23). Tighten pipe end-fitting (22).
(14)Connect pipe (29) to elbow union (27). Tighten pipe end-fitting (28).
(15)Connect pipe (32) to elbow union (30). Tighten pipe end-fitting (31).
(16)Connect pipe (42) to elbow union (40). Tighten pipe end-fitting (41).
(17)Connect electrical connectors (12) (60) (17) (9) to the receptacles on manifold.

E. Tests
(1)Remove safety clips and tags and close these circuit breakers : 1GQ, 1GR, 1GL, 6GL, 4GE, 7GX and 23GX.
(2)Make certain that fluid level in Yellow hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Pressurize Yellow hydraulic system reservoir (Ref. 29-14-00, P. Block 301).

(4)Bleed hydraulic system using door actuator (Ref. 52-33-00, P. Block 301).
(5)Remove support struts.
(6)On panel 9VU, press **PARKING BRAKE ACCU PRESS** pushbutton switch.
On panel 4VU, check that **ACCU PRESS** indicator rises and stabilizes at green band.
(7)Visually check for hydraulic fluid leakage at the various line connections.
(8)Check for air leakage, using soapy water and direct reading pressure gage.
(9)Check that quantity transmitter direct reading gage and quantity indicator in flight compartment read same indication.
(10)Pressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(11)Check the pumps delivery relief valve (76) (Ref. 29-11-55, P. Block 601).
(12)Carry out an alternate braking operational test (Ref. 32-43-00, P. Block 501).
(13)Carry out an operational test of the hydraulic activation and power transmission (Flaps) - (Ref. 27-54-00, P. Block 501).
(14)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).

F. Close-up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Close cargo-compartment doors (Ref. 52-33-00, P. Block 1).
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Typical Non-Return Valve and Extractor Plug Installation
Figure 402

R

RESERVOIR RETURN FILTER 293002 - SERVICING

Servicing procedure of Yellow reservoir return filter 293002 is dealt with in 29-11-15.

MANIFOLD - LP, YELLOW
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Plugs
(2)	Circuit Breaker(s) Safety Clip(s)
(3)	Container
(4)	Warning Notices
(5)	Access Platform 2.6 m (8 ft. 8 in.)
(6)	Lockwire
(7)98A52307523000	Support Struts-FWD and Aft Cargo Compartment Doors
(8)	Plastic or Wooden Scraper
(9)Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
(10)Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 20-23-12, P. Block 1	Specified Torque Values for Elbow Unions
- 20-28-11, P. Block 1	Electrical Bonding
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 29-00-00, P. Block 301	General Servicing
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-23-11, P. Block 401	Green/Yellow Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)
- 52-33-00, P. Block 1	Cargo Compartment Door Hydraulic System - Description/Operation
- 52-33-00, P. Block 301	Cargo Compartment Door Hydraulic System

2. Procedure

A. Job Set-Up
(1)On overhead panel 427VU in flight compartment :
(a)Make certain that Yellow electric pump is not operating (ELEC PUMP pushbutton switch legend off).

(b)Display a warning notice prohibiting pressurization and use of Yellow hydraulic system.

(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL &/CARGO DOOR PUMP	7GX	333/T51
101VU	ELEC HYD PUMP	23GX	GEN2/B5

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Open cargo compartment doors (Ref. 52-33-00, P. Block 1) and install cargo compartment struts (98A52307523000).
(6)Install access platform at zone 148.
(7)Depressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(8)Depressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(9)Place container under reservoir to be drained and place absorbent material around elbow unions.
(10)Drain Yellow hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(11)Disconnect isolation coupling from Power Transfer Unit (PTU) (Ref. 29-23-11, P. Block 401).

B. Removal

(Ref. Fig. 401)

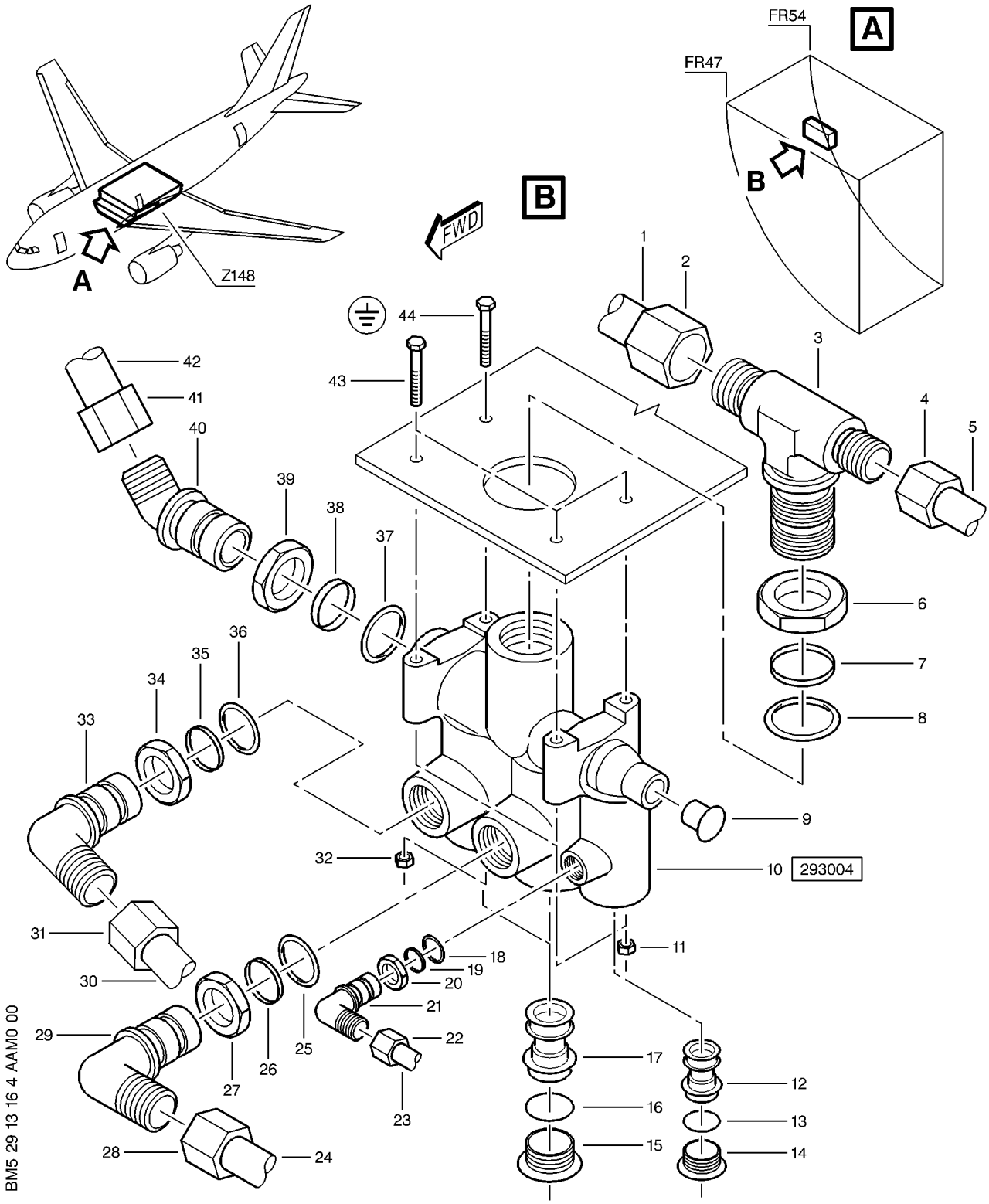
(1)Loosen pipe end-fitting (4) and disconnect pipe (5) from tee union (3).
(2)Loosen pipe end-fitting (2) and disconnect pipe (1) from tee union (3).
(3)Remove tee union (3) and nut (6) from manifold (10) and discard packings (7) and (8).
(4)Loosen pipe end-fitting (22) and disconnect pipe (23) from elbow union (21).
(5)Loosen pipe end-fitting (28) and disconnect pipe (24) from elbow union (29).
(6)Loosen pipe end-fitting (31) and disconnect pipe (30) from elbow union (33).
(7)Loosen pipe end-fitting (41) and disconnect pipe (42) from elbow union (40).
(8)Remove the three bolts (43) and the three nuts (11).
(9)Hold manifold (10) and remove bolt (44) and nut (32).
(10)Remove manifold (10) from support plate.
(11)Install blanking plugs on disconnected line ends.

C. Preparation of Replacement Component

(1)Remove parts which are attached to removed LP manifold (10).

NOTE : Put non-return valves, unions, cap and plugs into plastic bags to keep them clean.

(a)Cut, remove and discard lockwire from manifold (10).
(b)Remove elbow union (21) and nut (20) from manifold (10) and discard



Yellow LP Manifold
Figure 401

packings (18) and (19).
(c)Remove elbow union (29) and nut (27) from manifold (10) and discard packings (25) and (26).
(d)Remove elbow union (33) and nut (34) from manifold (10) and discard packings (35) and (36).
(e)Remove elbow union (40) and nut (39) from manifold (10) and discard packings (37) and (38).
(f)Remove extractor plugs (14) and (15) from manifold (10) and discard O-rings (13) and (16).
(g)Remove non-return valves (12) and (17) from manifold (10).
(h)Remove cap (9) from manifold (10).
(j)Install blanking plugs on manifold ports.
(2)Install removed parts on replacement manifold (10).
(Ref. Fig. 401).
(a)Remove blanking plugs from manifold (10).
(b)Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.
(c)Install cap (9) on manifold (10).
R (d)Installation of non-return valve (12).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE
R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-ring (13) in position on extractor plug (14).
R 2 Install extractor plug (14) on non-return valve (12).
R 3 Install non-return valve/extractor plug assembly on manifold (10).
R 4 TORQUE extractor plug (14) to between 7.3 and 7.4 m.daN (645 and
R 655 lbf.in.) (Ref. 20-23-12, P. Block 1).
R (e)Installation of non-return valves (17).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE
R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-rings (16) in position on extractor plugs (15).
R 2 Install extractor plugs (15) on non-return valves (17).
R 3 Install non-return valve/extractor plug assemblies on manifold (10).
R 4 TORQUE extractor plugs (15) to between 9.7 and 10.7 m.daN (859 and
R 947 lbf.in.) (Ref. 20-23-12, P. Block 1).
R (f)Safety non-return valves with lockwire.
R (g)Put new packings (37) and (38) in position on elbow union (40), install and tighten elbow union (40) and nut (39) on manifold (10).
TORQUE elbow union (40) and nut (39) to between 11.64 and 11.86 m.daN (1030 and 1050 lbf.in) (Ref. 20-23-12, P. Block 1).
R (h)Put new packings (35) and (36) in position on elbow union (33), install and tighten elbow union (33) and nut (34) on manifold (10).
TORQUE elbow union (33) and nut (34) to between 7.29 and 7.40 m.daN (645 and 655 lbf.in) (Ref. 20-23-12, P. Block 1).
R (j)Put new packings (25) and (26) in position on elbow union (29), install and tighten elbow union (29) and nut (27) on manifold (10).
TORQUE elbow union (29) and nut (27) to between 7.29 and 7.40 m.daN (645 and 655 lbf.in) (Ref. 20-23-12, P. Block 1).
R (k)Put new packings (18) and (19) in position on elbow union (21), install

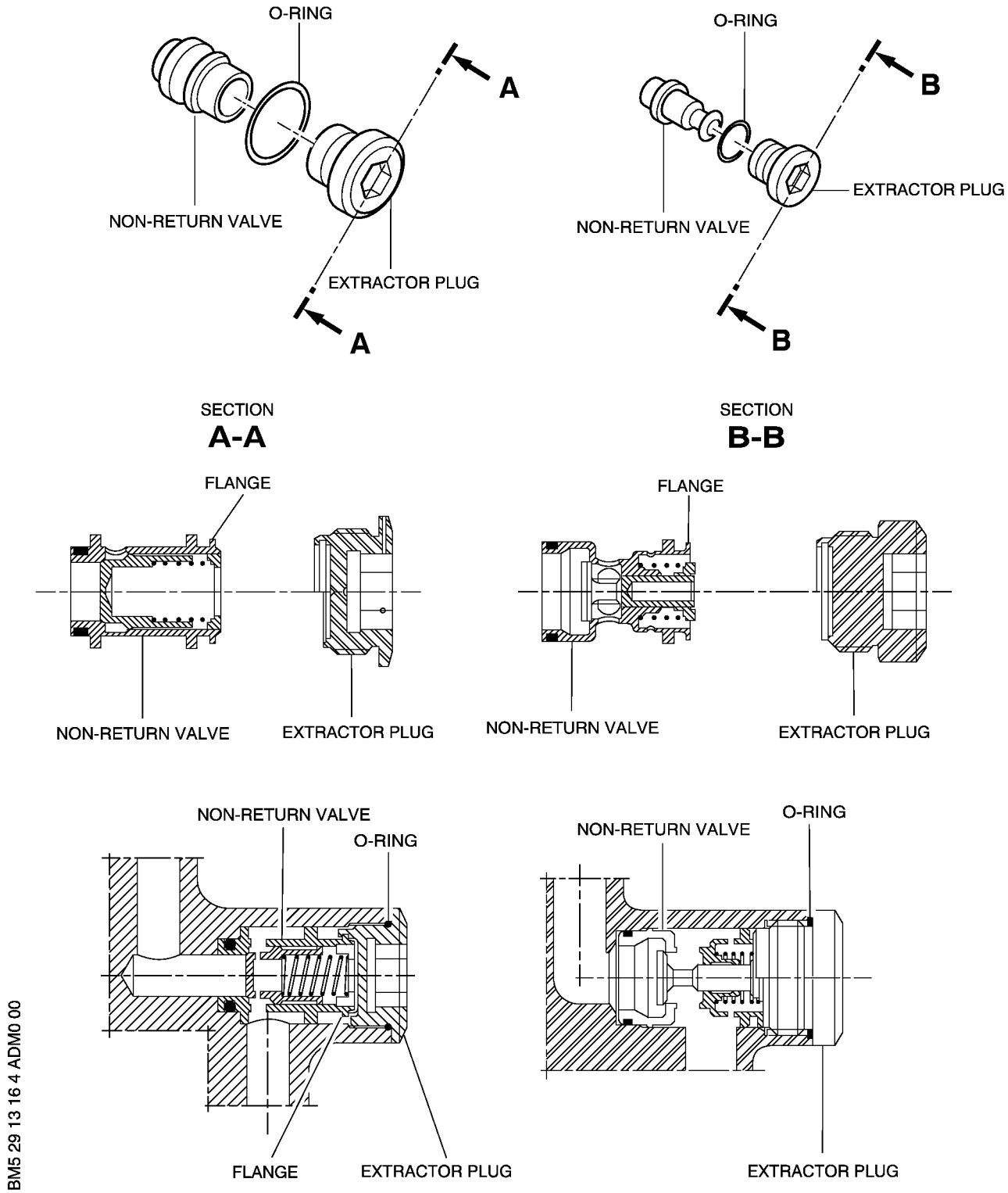
and tighten elbow union (21) and nut (20) on manifold (10).
TORQUE elbow union (21) and nut (20) to between 1.63 and 1.75 m.daN (144 and 155 lbf.in) (Ref. 20-23-12, P. Block 1).

D. Installation
(Ref. Fig. 401)
(1) Remove sealants from contact surface manifold (10) and aircraft structure with a plastic or wooden scraper.
(2) Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.
(3) Hold manifold (10) in position on aircraft.
(4) Put the three nuts (11) on the three bolts (43), install and tighten the three bolts (43).
(5) Put nut (32) on bolt (44), install and tighten bolt (44).
(6) Apply a layer of SEALANTS (Material No. 09-018) to contact surface of manifold (10).
(7) Make certain that electrical bonding is correct (Ref. 20-28-11, P. Block 1).
(8) Remove blanking plugs from pipe connections.
(9) Connect pipe (42) to elbow union (40), install and tighten pipe end-fitting (41).
TORQUE pipe end-fitting (41) to between 8.1 and 8.9 m.daN (717 and 788 lbf.in) (Ref. 20-23-12, P. Block 1).
(10) Connect pipe (23) to elbow union (21), install and tighten pipe end-fitting (22).
TORQUE pipe end-fitting (22) to between 1.8 and 2.0 m.daN (159 and 177 lbf.in) (Ref. 20-23-12, P. Block 1).
(11) Connect pipe (24) to elbow union (29), install and tighten pipe end-fitting (28).
TORQUE pipe end-fitting (28) to between 4.8 and 5.3 m.daN (425 and 469 lbf.in) (Ref. 20-23-12, P. Block 1).
(12) Connect pipe (30) to elbow union (33), install and tighten pipe end-fitting (31).
TORQUE pipe end-fitting (31) to between 4.8 and 5.3 m.daN (425 and 469 lbf.in) (Ref. 20-23-12, P. Block 1).
(13) Put new packings (7) and (8) in position on tee union (3), install and tighten tee union (3) and nut (6) on manifold (10).
TORQUE tee union (3) and nut (6) to between 14.10 and 14.30 m.daN (1248 and 1266 lbf.in) (Ref. 20-23-12, P. Block 1).
(14) Connect pipe (5) to tee union (3), install and tighten pipe end-fitting (4).
TORQUE pipe end-fitting (4) to between 4.8 and 5.3 m.daN (425 and 469 lbf.in) (Ref. 20-23-12, P. Block 1).
(15) Connect pipe (1) to tee union (3), install and tighten pipe end-fitting (2).
TORQUE pipe end-fitting (2) to between 9.7 and 10.7 m.daN (859 and 947 lbf.in) (Ref. 20-23-12, P. Block 1).

E. Tests
(1) Remove safety clips and tags and close these circuit breakers : 1GQ, 1GR, 6GL, 4GE, 7GX and 23GX.

(2)Make certain that fluid level in Yellow hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Pressurize Yellow hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Bleed hydraulic system using door actuator (Ref. 52-33-00, P. Block 301).
(5)Remove support struts.
(6)Visually check for hydraulic fluid leakage at the various line connections.
(7)Check for air leakage, using soapy water and direct-reading pressure gage.
(8)Check that quantity transmitter direct-reading gage and quantity indicator in flight compartment read same indication.
(9)Pressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).

F. Close-up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Close cargo-compartment doors (Ref. 52-33-00, P. Block 1).
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Typical Non-Return Valve and Extractor Plug Installation
Figure 402

R

VALVE-DEPRESSURIZATION/RELIEF (293005) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Blanking Plugs
C.	Circuit Breaker Safety Clips
D.	Warning Notices
E. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Reservoir Replenishing
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

R (Ref. Fig. 401)

A. Job Set-Up

(1)On panel 427VU,
- display a warning notice prohibiting pressurization and use of Yellow hydraulic system.

(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B 8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL&/CARGO DOOR/PUMP	7GX	333/T51

(3)Install access platform at zone 671.
(4)Open access door 671DB.
(5)Display a warning notice on ground connector prohibiting pressurization and use of Yellow hydraulic system.
(6)Open main gear doors (Ref. 32-12-11, P. Block 301).
(7)Depressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Depressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).

B. Removal

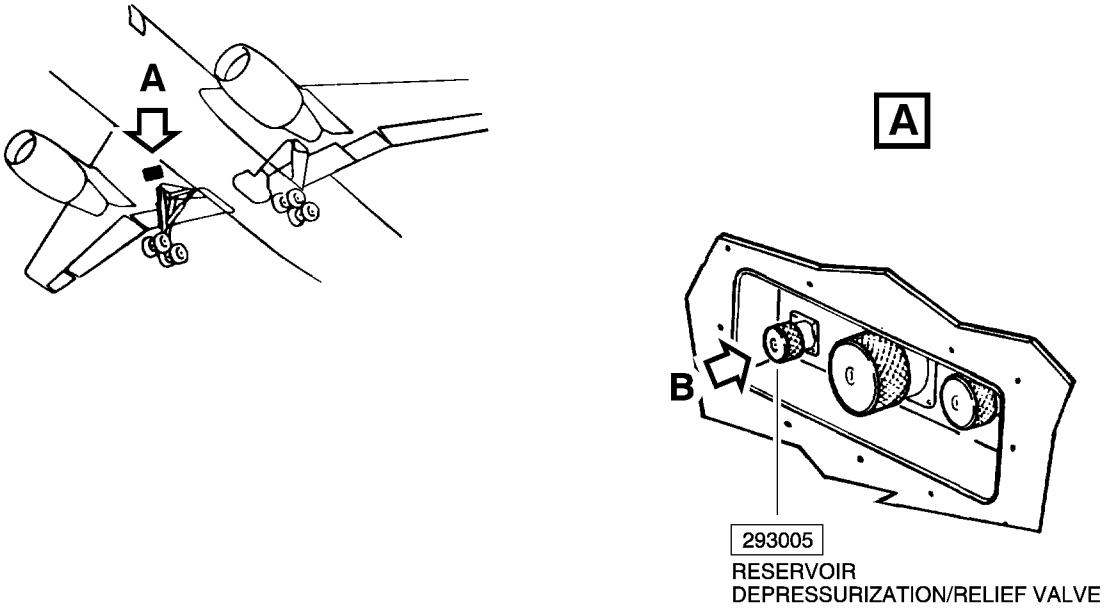
(1)Disconnect line from union (2) from inner side of aircraft structure (1).
(2)Put blanking plug on disconnected line end.
(3)Remove three screws (7) and washers (6).
(4)Remove valve (5).
R (5)Remove union (2) and discard packing (4).
(6)Put blanking plug in port of valve (5).

C. Preparation of Replacement Component

(1)Make certain that the parts retained from the removed component are clean and in correct condition.
(2)Remove blanking plug from port of valve (5).
R (3)Install a new packing (4) on union (2) and install union (2) in in port of valve (5).

D. Installation

(1)Clean and inspect component interface and/or component adjacent area.
(2)Remove plug from disconnected line end.
(3)Install valve (5).
NOTE : Do not forget to attach chain (8) when installing washers (6) and screws (7).
(4)Install washers (6) and screws (7) and tighten.
(5)Apply Hydraulic Fluid (Material No. 02-003) to union (2) threads.
(6)Connect line to union (2).



BM5 29 13 19 4 AAM0 01

R Yellow Reservoir Depressurization/Relief Valve
Figure 401

E. Test
(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 1GL, 6GL and 7GX.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics rack ventilation is correct.
(3)Pressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Pressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(5)Check for leakage at valve (5) using soapy water.
(6)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door.
(3)Close main gear doors (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

ENGINE PUMP 293031 - REMOVAL/INSTALLATION

Removal/Installation of Yellow engine pump 3031 is dealt with in topic 29-11-32, P. Block 401.

MANIFOLD - SERVO CONTROLS, Y
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F.	Lockwire
G.	Plastic or Wooden Scraper
H. 98A52307523000	Support Struts - FWD and AFT Cargo Compartment Doors
J. 97A29102090000	Bobbin and Ring Installation Tool
K. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
L. Material No. 09-018	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 20-23-21, P. Block 1	Hydraulic Bobbins
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 27-14-11, P. Block 401	Selector Valve - Servo Controls
- 27-14-18, P. Block 401	Pressure Switch - Servo Controls
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (FLAPS)
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 29-23-11, P. Block 401	Green/Yellow Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)
- 52-33-00, P. Block 1	Cargo Compartment Door
- 52-33-00, P. Block 301	Cargo Compartment Door Hydraulic System

2. Procedure

A. Job Set-Up

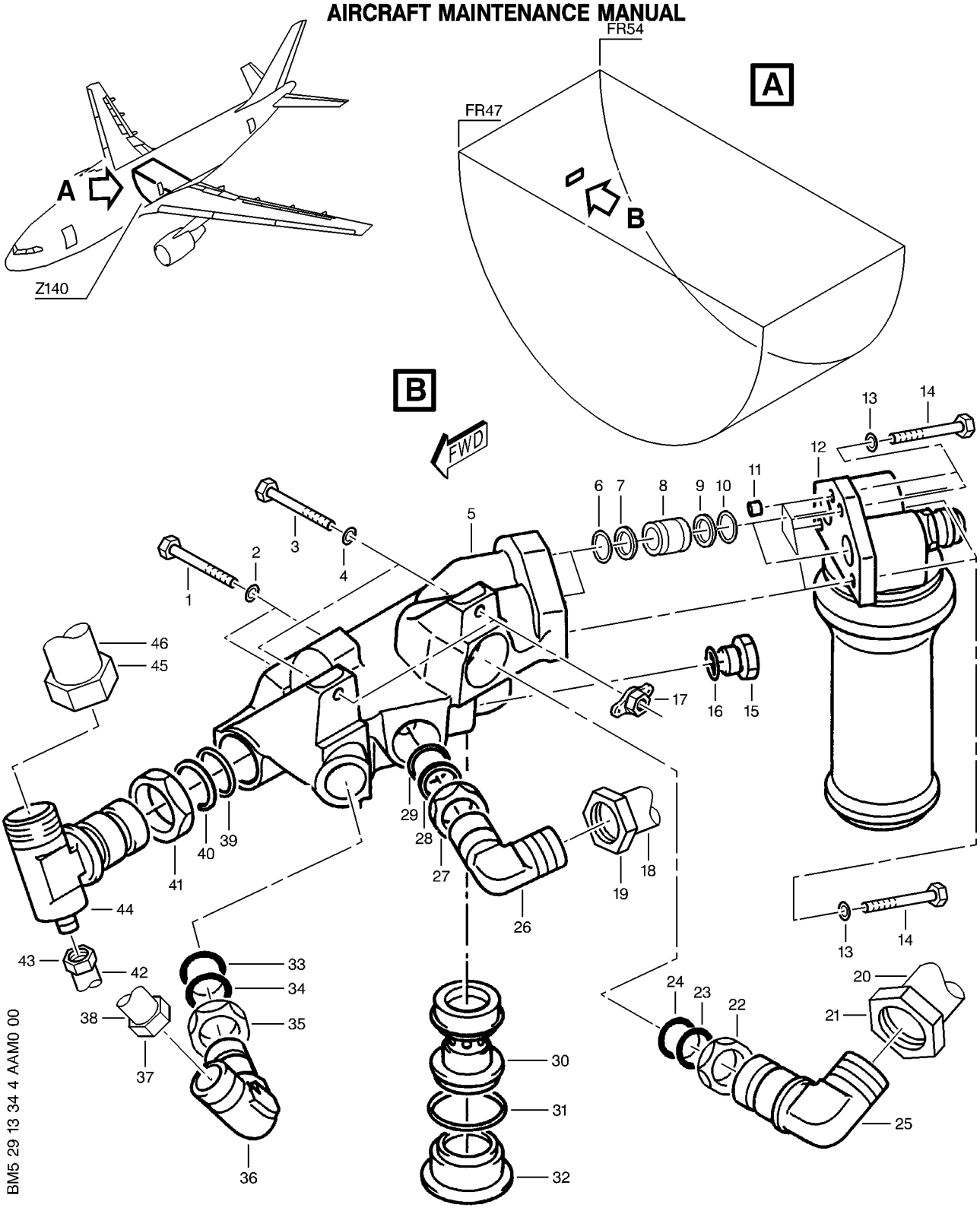
(1)On overhead panel 427VU in flight compartment :
(a)Make certain that Green electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).
(b)Display a warning notice prohibiting pressurization and use of Green hydraulic system.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL &/CARGO DOOR PUMP	7GX	333/T51
101VU	ELEC HYD PUMP	23GX	GEN2/B 5

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Open cargo compartment door (Ref. 52-33-00, P. Block 1) and install cargo compartment support struts (98A52307523000).
(6)Install access platform at zone 140.
(7)Depressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(8)Depressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(9)Place container under reservoir to be drained and place absorbent material around unions.
(10)Drain Yellow hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(11)Disconnect isolation coupling of Power Transfer Unit (PTU) (Ref. 29-23-11, P. Block 401).
(12)Remove selector valve (Ref. 27-14-11, P. Block 401).
(13)Remove pressure switch (Ref. 27-14-18, P. Block 401).

B. Removal
(Ref. Fig. 401)
(1)Loosen pipe end-fitting (19) and disconnect pipe (18) from elbow union (26).
(2)Loosen pipe end-fitting (21) and disconnect pipe (20) from elbow union (25).
(3)Loosen pipe end-fitting (37) and disconnect pipe (38) from elbow union (36).
(4)Loosen pipe end-fitting (43) and disconnect pipe (42) from tee union (44).
(5)Loosen pipe end-fitting (45) and disconnect pipe (46) from tee union (44).
(6)Hold manifold (5) and remove bolts (1) and (3), washers (2) and (4) and nuts (17). Remove manifold (5).
(7)Install blanking plugs on disconnected line ends and manifold ports.

C. Preparation of Replacement Component



Y Servo Controls Manifold
Figure 401

CAUTION : WHEN REMOVING THE BOBBINS, GREAT CARE SHOULD BE TAKEN NOT TO DAMAGE THEM. IT IS RECOMMENDED TO USE SPECIAL TOOL 97A29102090000.

(1)Remove parts which are attached to removed manifold (5).
  (a)Remove filter (12).
    1 Cut, remove and discard lockwire.
    2 Remove bolts (14), washers (13) and remove filter (12).
    3 Remove and discard seals (10), packings (6) and O-rings (7) and (9) from bobbins (8) (Ref. 20-23-21, P. Block 1).
    4 Remove inserts (11).
  (b)Put bobbins (8) into plastic bags to keep them clean.
  (c)Install blanking plugs in open ports of all removed components.
  (d)Remove elbow union (26) and nut (27) from manifold (5) and discard packings (28) and (29).
  (e)Remove elbow union (25) and nut (22) from manifold (5) and discard packings (23) and (24).
  (f)Remove elbow union (36) and nut (35) from manifold (5) and discard packings (33) and (34).
  (g)Remove tee union (44) and nut (41) from manifold (5) and discard packings (39) and (40).
  (h)Remove cap (32) and valve (30) from manifold (5) and discard packing (31).
  (j)Remove cap (15) from manifold (5) and discard packing (16).
(2)Install removed parts on replacement manifold (5). (Ref. Fig. 401).
  (a)Remove blanking plugs from manifold (5) and components.
  (b)Apply HYDRAULIC FLUIDS (Material No. 02-003) to union threads.
  (c)Put new packings (39) and (40) in position on tee union (44). Install tee union (44) and tighten nut (41) on manifold (5).
  (d)Put new packings (33) and (34) in position on elbow union (36). Install elbow union (36) and tighten nut (35) on manifold (5).
  (e)Put new packings (28) and (29) in position on elbow union (26). Install elbow union (26) and tighten nut (27) on manifold (5).
  (f)Put new packings (23) and (24) in position on elbow union (25). Install elbow union (25) and tighten nut (22) on manifold (5).
    NOTE : Make sure that you install the square-section seal on the end of the bobbins without the identification groove.
    NOTE : Make sure that you install the bobbins so that the identification groove is in the manifold.
  (g)Install filter (12).
    1 Put new seals (10), packings (6) and O-rings (7) and (9) in position on bobbins (8).
    2 Install bobbins (8) in ports of manifold (5) (Ref. 20-23-21, P. Block 1).
    3 Install filter (12). Install bolts (14), washers (13) and inserts (11). Tighten bolts (14) and safety with lockwire.
  (h)Install new packing (16) and install and tighten cap (15).
R (j)Installation of non-return valve (30).
R (Ref. Fig. 402).
R CAUTION : MAKE SURE THAT THE NON-RETURN VALVE IS INSTALLED WITH THE
R EXTRACTOR PLUG OVER THE NON-RETURN VALVE FLANGE. IF YOU DO

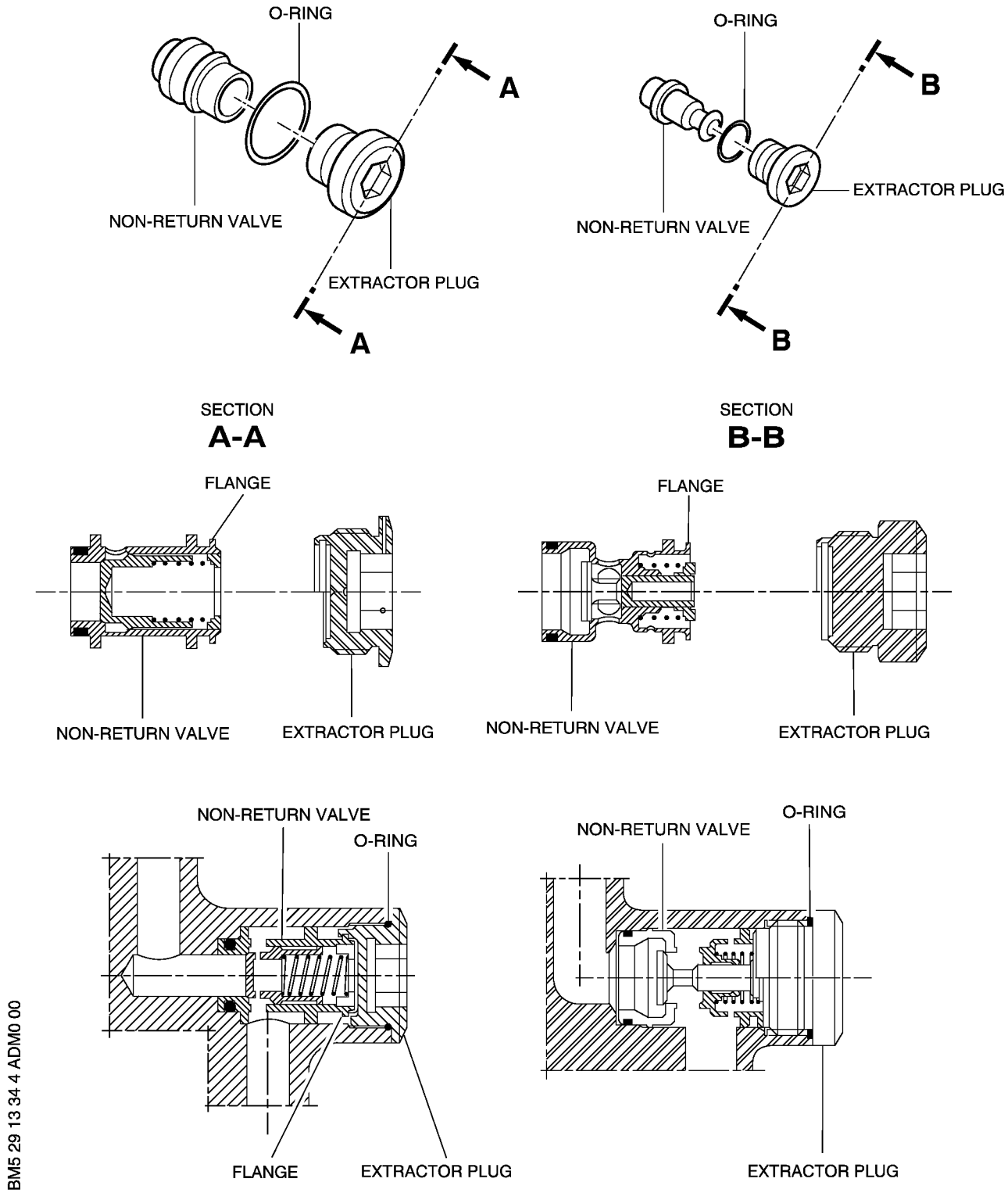
R NOT TAKE THESE PRECAUTIONS, HYDRAULIC LEAKS CAN OCCUR.
R 1 Put new O-ring (31) in position on extractor plug (32).
R 2 Install extractor plug (32) on non-return valve (30).
R 3 Install non-return valve/extractor plug assembly on manifold (5).
R 4 TORQUE extractor plug (32) to between 9.7 and 10.7 m.daN (859 and
R 947 lbf.in.) (Ref. 20-23-12, P. Block 1).

D. Installation
(Ref. Fig. 401)
(1)Remove sealant from contact surface of manifold (5) and aircraft structure with a plastic or wooden scraper.
(2)Examine structure of aircraft in area of manifold attachment for cracks, corrosion or other damage.
(3)Put manifold (5) in position on aircraft.
(a)Install bolts (1) and washers (2).
(b)Tighten bolts (1). Safety bolts (1) with lockwire.
(c)Install bolts (3), washers (4) and nuts (17).
(d)Tighten nuts (17) and safety with lockwire.
(4)Apply a layer of SEALANTS (Material No. 09-018) to contact surface of manifold (5).
(5)Remove blanking plugs from pipe connections.
(6)Connect pipe (46) to tee union (44). Tighten pipe end-fitting (45).
(7)Connect pipe (42) to tee union (44). Tighten pipe end-fitting (43).
(8)Connect pipe (38) to elbow union (36). Tighten pipe end-fitting (37).
(9)Connect pipe (20) to elbow union (25). Tighten pipe end-fitting (21).
(10)Connect pipe (18) to elbow union (26). Tighten pipe end-fitting (19).
(11)Install pressure switch (Ref. 27-14-18, P. Block 401).
(12)Install selector valve (Ref. 27-14-11, P. Block 401).

E. Tests
(1)Remove safety clips and tags and close these circuit breakers : 1CB, 2CB, 1GQ, 1GR, 1GL, 6GL, 4GE, 7GX and 23GX.
(2)Make certain that fluid level in Yellow hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Pressurize Yellow hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(4)Bleed the Yellow hydraulic system (Ref. 29-00-00, P. Block 401).
(5)Bleed the hydraulic system using door actuator (Ref. 52-33-00, P. Block 301).
(6)Remove support struts.
(7)On panel 9VU, press PARKING BRAKE ACCU PRESS pushbutton switch. On panel 4VU, check that ACCU PRESS indicator rises and stabilizes at green band.
(8)Visually check for hydraulic fluid leakage at the various line connections.
(9)Check for air leakage, using soapy water and direct reading pressure gage.
(10)Check that quantity transmitter direct reading gage and quantity indicator in flight compartment read same indication.
(11)Pressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(12)Carry out an operational test of the hydraulic actuation and power

transmission (Flaps) (Ref. 27-54-00, P. Block 501).
(13)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).
(14)Carry out an operational test of the servo control selector valve, (Ref. 27-14-11, P. Block 401).
(15)Carry out an operational test of the servo control pressure switch (Ref. 27-14-18, P. Block 401).

F. Close-up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Remove access platform.
(5)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(6)Close cargo compartment doors (Ref. 52-33-00, P. Block 1).
(7)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Typical Non-Return Valve and Extractor Plug Installation
Figure 402

R

RESERVOIR 293000 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

CAUTION : WHENEVER CARGO COMPARTMENT DOORS REMAIN OPEN DURING MAINTENANCE ON YELLOW HYDRAULIC SYSTEM (DISCONNECTION OF HYDRAULIC LINES OR REPLACEMENT OF HYDRAULIC COMPONENTS), MAKE CERTAIN THAT CARGO COMPARTMENT DOOR ACTUATOR IS FILLED WITH HYDRAULIC FLUID. IF NOT, BLEED ACTUATOR AND PRESSURIZE LINES PRIOR TO CLOSING DOOR (REF. 52-33-00, P. BLOCK 301).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Safety Barriers
B.	Warning Notices
C.	Hydraulic Fluid Containers
D.	Access Platform, 2.6 m (8 ft. 6 in.)
E.	Corrosion - Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
F. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00, P. Block 1)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	General - Removal/Installation
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-33-00, P. Block 301	Cargo Compartment Door Hydraulic System

2. Procedure

A. Job Set-Up
(1) Open cargo compartment doors if their opening is required for other maintenance operations in progress on aircraft (Ref. 52-30-00, P. Block 1)
(2) On overhead panel 427VU in flight compartment :
Display a warning notice prohibiting pressurization and use of Yellow hydraulic system.
(3) Open, safety and tag the following circuit breakers :
CAUTION : PROHIBIT OPERATION ON CB 7GX BY DISPLAYING A WARNING NOTICE.

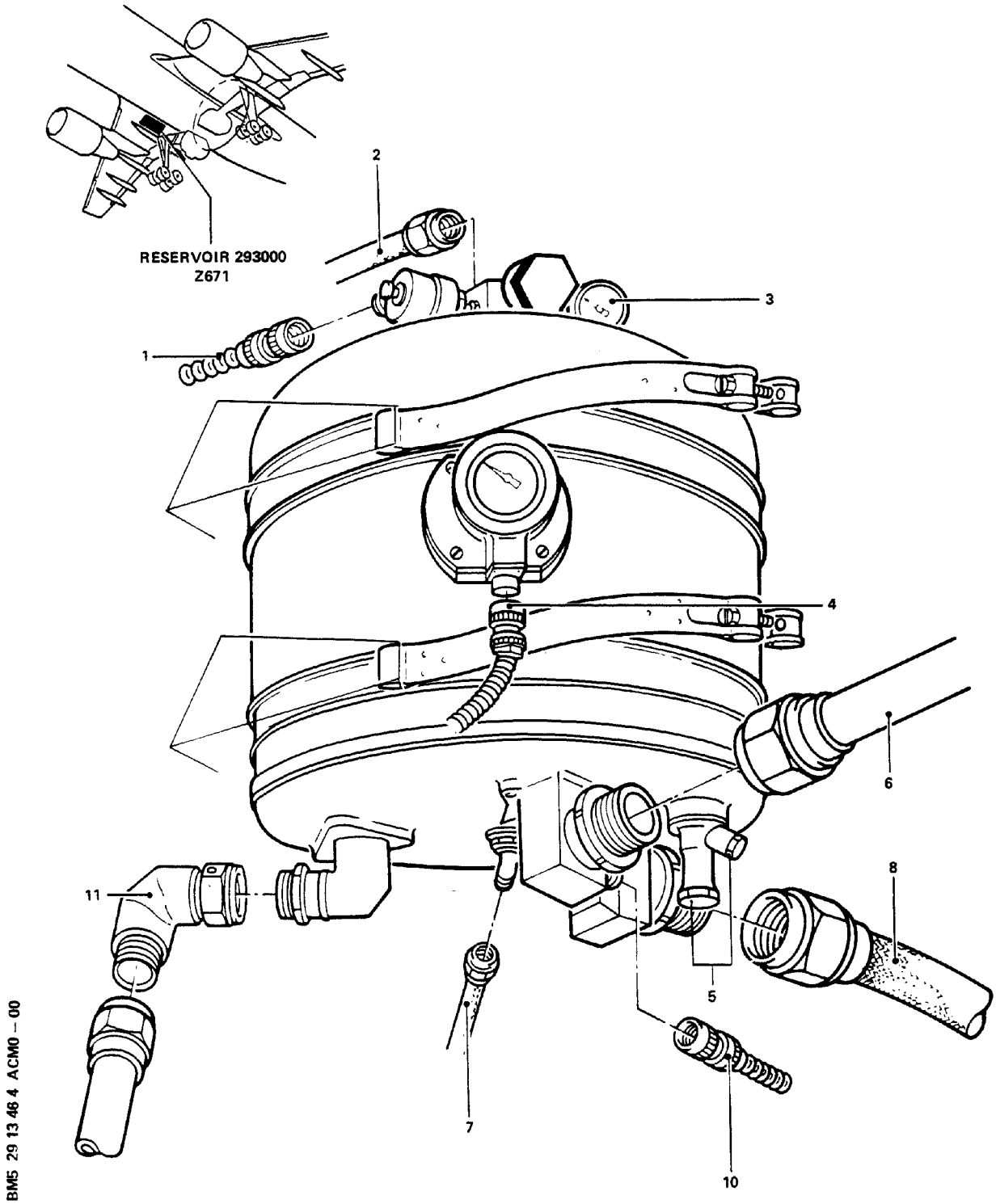
PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(4)Install access platform at zone 671.
(5)Display a warning notice prohibiting use of hand pump and Yellow electric pumps.
R (6)Open access doors 671DB and 671BB.
(7)Depressurize Yellow hydraulic system (Ref. 29-10.00, P. Block 301).
(8)Depressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(9)Place container under reservoir to be drained and place absorbent material around unions.
(10)Drain yellow hydraulic reservoir (Ref. 29-00-00, P. Block 301).

B. Removal
(Ref. Fig. 401)
(1)Disconnect electrical connectors (1), (4) and (10).
(2)Disconnect the following lines : engine pump suction (8), reservoir depressurization/relief (7), reservoir pressurization (2), reservoir return (6), and ram air turbine suction (11).
(3)Plug/cap reservoir ports and open line ends.
(4)Remove bonding strip.
(5)Cut and remove lockwire and loosen clamp screws of both straps.
(6)Remove reservoirs.

C. Preparation of Replacement Component
WARNING : THE REPLACEMENT RESERVOIR IS EQUIPPED WITH ITS CONNECTIONS, ATTACHING SCREWS INSTALLED BUT NOT TIGHTENED.
(1)Check that reservoir to be installed has not sustained any deterioration due to impacts or/and distortion and that paintwork is free from any scratches. Check that pressure and quantity gage glasses are in good condition.
(2)Remove blanking plugs/caps and lubricate union threads with Material No. 02-003 (Ref. 20-31-00, P. Block 1).

D. Installation
(1)Position reservoir in its cradle.
(2)Install the two straps. Do not tighten straps.
(3)Connect the following lines : reservoir return (6), reservoir depressurization/relief (7), reservoir pressurization (2), engine pump suction (8), and ram air turbine suction (11).
(4)TORQUE the screws of the replacement reservoir connections to 0.5 m.daN (3.7 lbf.ft.). Wirelock.
(5)Connect electrical connectors (1), (4) and (10).
(6)Install bonding strip.



Yellow Hydraulic Reservoir
Figure 401

(7)Tighten reservoir attaching straps and wirelock clamp nuts.

E. Test
(1)Remove safety clips and tags and close circuit breakers 1GQ, 1GR, 1GL, 6GL, 4GE and 7GX.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(3)Pressurize reservoir (Ref. 29-14-00, P. Block 301).
(4)Fill reservoir (Ref. 12-12-29, P. Block 1).
(5)Make certain that drain valve plugs (5) are wirelocked.
(6)Visually check for leakage of hydraulic fluid at the various line connections.
(7)Check for leakage of air, using soapy water and direct reading pressure gage (3).
(8)Check that quantity transmitter direct reading gage and quantity indicator in flight compartment read same indication.

F. Close-Up
(1)Remove container and absorbent material.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notices.
(4)Install access doors, close access doors.
(5)Close cargo compartment doors if they have been opened (Ref. 52-30-00, P. Block 1)
(6)Remove access platform.
(7)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. Procedure of Removal/Installation of Pressure Switch
Refer to 29-11-11, P. Block 401.

4. Procedure of Removal/Installation of Check Valve
Refer to 29-11-11, P. Block 401.

PUMP DELIVERY FILTER 293049 - SERVICING

Servicing procedure of Yellow pump delivery filter 3049 is dealt with in 29-11-42, P. Block 301.

PUMP DELIVERY RELIEF VALVE 293063 - REMOVAL/INSTALLATION

Removal/Installation of Yellow pump delivery relief valve 293063 is dealt with in topic 29-11-55, P. Block 401.

ACCUMULATOR 293070 - REMOVAL/INSTALLATION

Removal/Installation of Yellow accumulator 3070 is dealt with in topic 29-11-56, P. Block 401.

ENGINE PUMP PRESSURE SWITCH 6GD - REMOVAL/INSTALLATION

Removal/Installation of engine pump pressure switch **6GD** is dealt with in topic 29-12-62, P. Block 401.

GROUND CONNECTOR - SELF SEALING, Y
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Y Suction Self-Sealing Ground Connector

A. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F. 98A52307523000	Support Struts - FWD and AFT Cargo Comparment Doors
G. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)
- 52-33-00, P. Block 1	Cargo Compartment Door
- 52-33-00, P. Block 301	Cargo Compartment Door Hydraulic System

B. Procedure

(1)Job set-up.

(a)On overhead panel 427VU in the flight compartment :

1 Make certain that the Yellow electric pump is not operating (ELEC PUMP pushbutton switch legend off).

2 Make sure that the PTU G/Y pushbutton switch is released (ON legend off).

3 Display a warning notice prohibiting pressurization and use of the Yellow hydraulic system.

(b)Open, safety and tag the following circuit breakers :

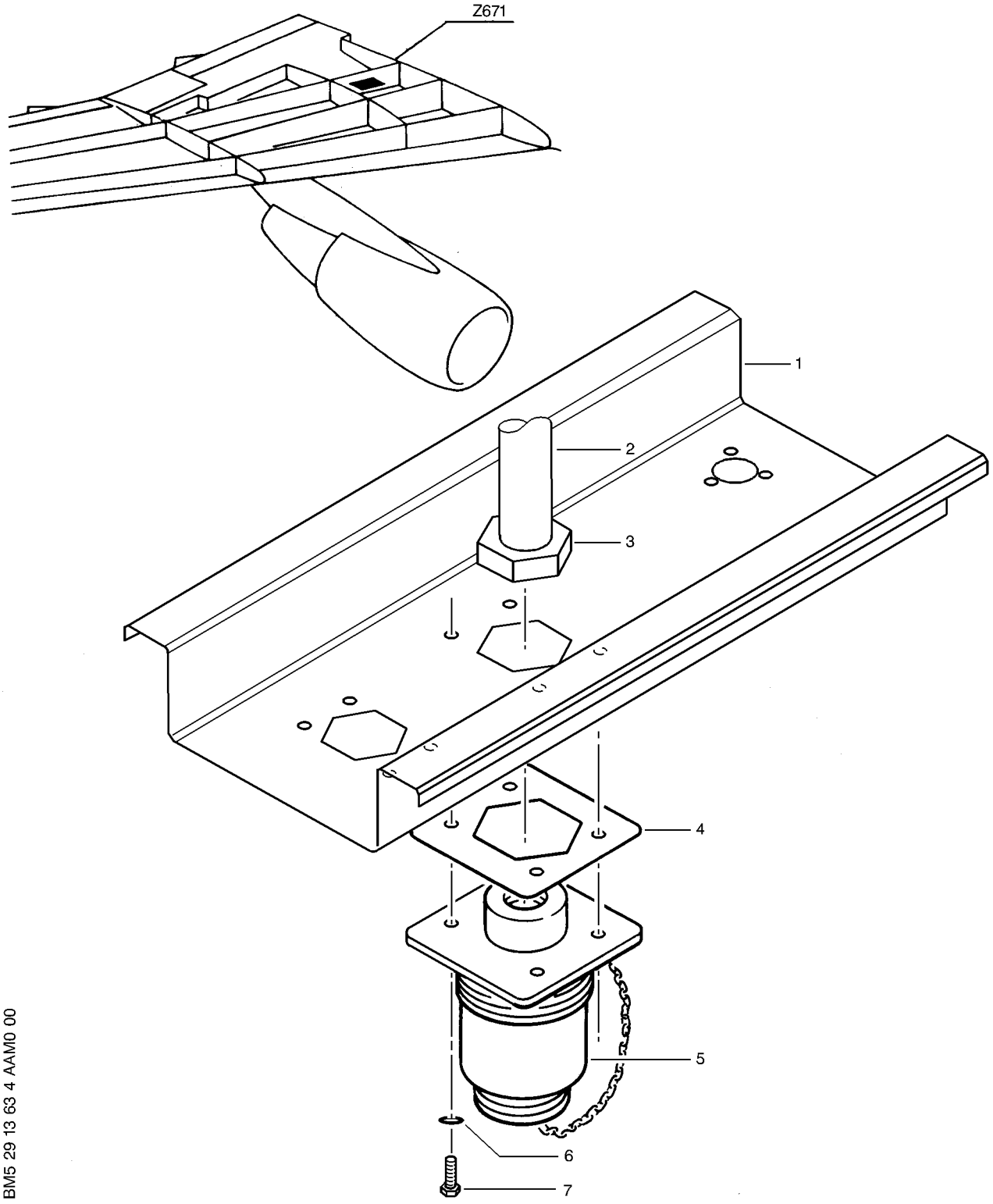
PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL &/CARGO DOOR PUMP	7GX	333/T51
101VU	ELEC HYD PUMP	23GX	GEN2/B 5

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Open the main landing gear doors (Ref. 32-12-11, P. Block 301).
(e)Open the cargo compartment door (Ref. 52-33-00,P. Block 1) and install the cargo compartment support struts (98A52307523000).
(f)Install an access platform at zone 671.
(g)Depressurize the Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(h)Depressurize the Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(j)Install a container and absorbent material under the Yellow hydraulic reservoir and around the ground connector.
(k)Drain the Yellow hydraulic reservoir (Ref. 29-00-00, P. Block 301).

(2)Removal.
(Ref. Fig. 401)
(a)Loosen the pipe end fitting (3) and disconnect the pipe (2) from the Blue suction ground connector (5).
(b)Hold the connector (5) and remove the bolts (7) and washers (6).
(c)Remove the connector (5) from the Blue ground service panel (1).
(d)Remove and discard the packing (4) from the connector (5).
(e)Install blanking plugs on the disconnected line ends and connector port.

(3)Installation.
(a)Examine the structure of aircraft in the connector attachment area for cracks, corrosion or other damage.
(b)Remove the blanking plugs from the disconnected line ends and connector port.
(c)Apply HYDRAULIC FLUIDS (Material No. 02-003) to threads of connector (5).
(d)Install a new packing (4) on the connector (5).
(e)Put and hold the connector (5) in position on the Yellow ground service panel (1).
(f)Install the bolts (7) and washers (6) and TORQUE the bolts (7) to between 0.83 and 0.94 m.daN (73.45 and 83.18 lbf.in.).
(g)Connect the pipe (2) and TORQUE the pipe end fitting (3) to between 9.7 and 10.7 m.daN (71.53 and 78.90 lbf.ft).

(4)Tests.
(a)Remove safety clips and tags and close these circuit breakers : 1CB, 2CB, 1GQ, 1GR, 1GL, 6GL, 4GE, 7GX and 23 GX.
(b)Make certain that the fluid level in the Yellow hydraulic system



Y Suction Self-Sealing Ground Connector
Figure 401

reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(c)Pressurize the Yellow hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(d)Bleed the Yellow hydraulic system (Ref. 29-00-00, P. Block 401).
(e)Bleed the hydraulic system using door actuator (Ref. 52-33-00, P. Block 301).
(f)Remove the support struts.
(g)On the panel 9VU, check the **PARKING BRAKE ACCU PRESS** pushbutton switch. On the panel 4VU, check that the **ECCU PRESS** indicator rises and stabilizes at green band.
(h)Visually check for hydraulic fluid leakage at the various line connections.
(j)Check for air leakage, using soapy water and direct reading pressure gage.
(k)Check that the quantity transmitter direct reading gage and the quantity indicator in the flight compartment give the same indication.
(l)Pressurize the Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(mj)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).

(5)Close-up.
(a)Remove the container and absorbent material.
(b)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(c)Remove the warning notices.
(d)Remove the access platform.
(e)Close the main landing gear doors (Ref. 32-12-11, P. Block 301).
(f)Close the cargo compartment doors (Ref. 52-33-00, P. Block 1).
(g)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Y Delivery Self-Sealing Ground Connector

A. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Circuit Breaker(s) Safety Clip(s)
C.	Container
D.	Warning Notices
E.	Access Platform 2.6 m (8 ft. 8 in.)
F. 98A52307523000	Support Struts - FWD and AFT Cargo Compartment Doors
G. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 24-41-00, P. Block 301	Servicing AC External Power Control
- 24-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (FLAPS)
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General

ITEM	DESIGNATION
- 29-10-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Servicing Pressurization/Depressurization of Hydraulic Reservoir
- 29-14-00, P. Block 501	Hydraulic Reservoir Pressurizing System
- 29-23-11, P. Block 401	Green/Yellow Power Transfer Unit
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)
- 52-33-00, P. Block 1	Cargo Compartment Door
- 52-33-00, P. Block 301	Cargo Compartment Door Hydraulic System

B. Procedure

(1)Job set-up.

(a)On overhead panel 427VU in the flight compartment :

1 Make certain that the Yellow electric pump is not operating (ELEC PUMP pushbutton switch legend off).

2 Make sure that the PTU G/Y pushbutton switches are released (ON legend off).

3 Display a warning notice prohibiting pressurization and use of the Yellow hydraulic system.

(b)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL &/CARGO DOOR PUMP	7GX	333/T51
101VU	ELEC HYD PUMP	23GX	GEN2/B 5

(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(d)Open the main landing gear doors (Ref. 32-12-11, P. Block 301).

(e)Open the cargo compartment door (Ref. 52-33-00, P. Block 1) and install the cargo compartment support struts (98A52307523000).

(f)Install an access platform at zone 671.

(g)Depressurize the Yellow hydraulic system (Ref. 29-10-00, P. Block 301).

(h)Depressurize the Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).

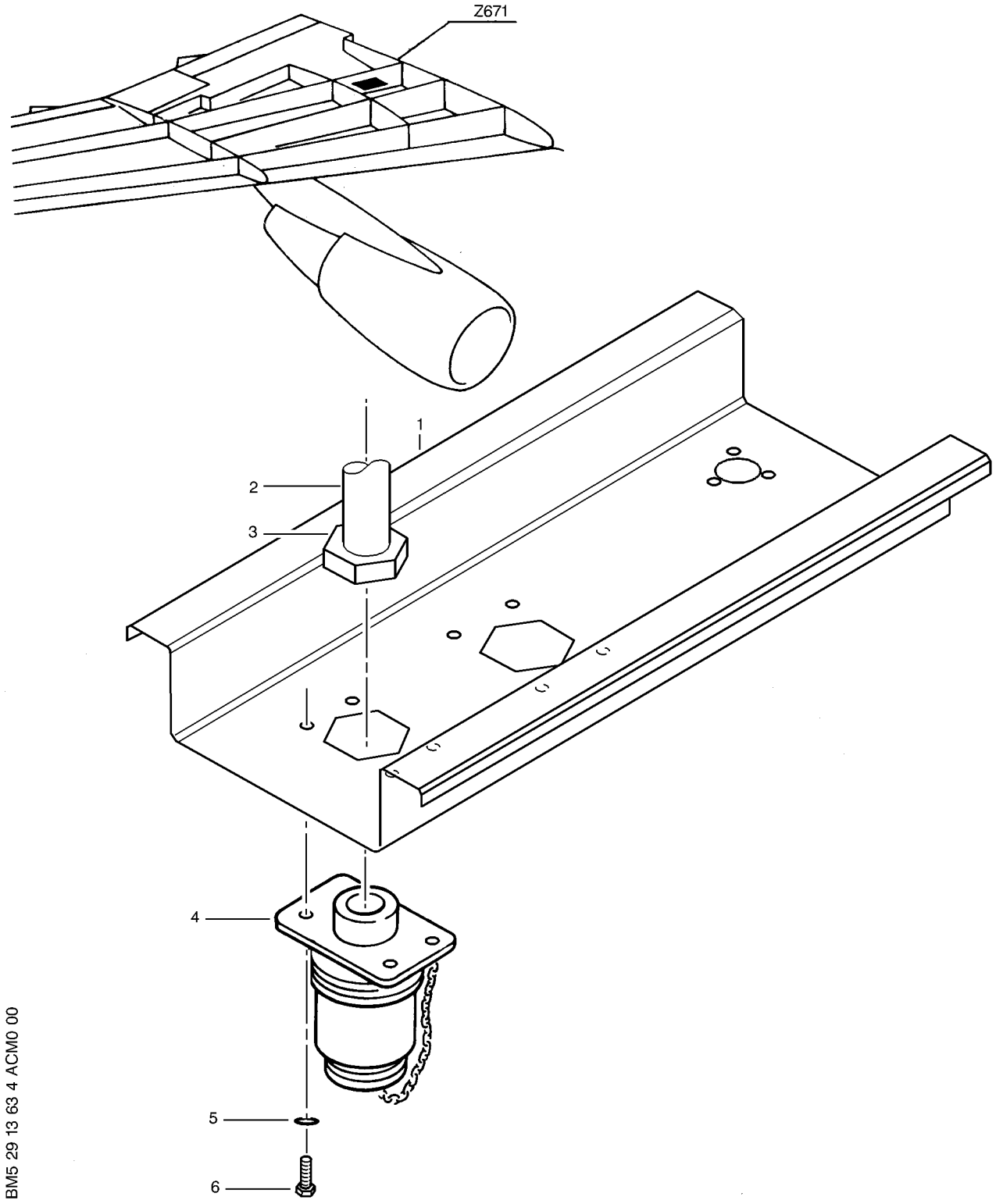
(j)Install a container and absorbent material under the Yellow hydraulic reservoir and around the ground connector.

(k)Drain the Yellow hydraulic reservoir (Ref. 29-00-00, P. Block 301).

(l)Disconnect the isolation coupling from Power Transfer Unit (PTU) (Ref. 29-23-11, P. Block 401).

(2)Removal.

(Ref. Fig. 402)



Y Delivery Self-Sealing Ground Connector
Figure 402

(a)Loosen the pipe end fitting (3) and disconnect the pipe (2) from the Yellow delivery ground connector (4).
(b)Hold the connector (4) and remove the bolts (6) and washers (5).
(c)Remove the connector (4) from the Blue ground service panel (1).
(d)Install blanking plugs on the disconnected line ends and connector port.

(3)Installation.
(a)Examine the structure of aircraft in the connector attachment area for cracks, corrosion or other damage.
(b)Remove the blanking plugs from the disconnected line ends and connector port.
(c)Apply HYDRAULIC FLUIDS (Material No. 02-003) to the threads of the connector (4).
(d)Put and hold the connector (4) in position on the Blue ground service panel (1).
(e)Install the bolts (6) and washers (5) and TORQUE the bolts (6) to between 0.83 and 0.94 m.daN (73.45 and 83.18 lbf.in.).
(f)Connect the pipe (2) and TORQUE the pipe end fitting (3) to between 9.7 and 10.7 m.daN (71.53 and 78.90 lbf.ft).

(4)Tests.
(a)Remove the safety clips and tags and close these circuit breakers : 1CB, 2CB, 1GQ, 1GR, 1GL, 6GL, 4GE, 7GX and 23GX.
(b)Make certain that the fluid level in the Yellow hydraulic system reservoir is correct. Add fluid as necessary (Ref. 12-12-29, P. Block 1).
(c)Pressurize the Yellow hydraulic system reservoir (Ref. 29-14-00, P. Block 301).
(d)Bleed the Yellow hydraulic system (Ref. 29-00-00, P. Block 401).
(e)Bleed the hydraulic system using door actuator (Ref. 52-33-00, P. Block 301).
(f)Remove the support struts.
(g)On the panel 9VU, check the PARKING BRAKE ACCU PRESS pushbutton switch. On the panel 4VU, check that the ECCU PRESS indicator rises and stabilizes at green band.
(h)Visually check for hydraulic fluid leakage at the various line connections.
(j)Check for air leakage, using soapy water and direct reading pressure gage.
(k)Make certain that the quantity transmitter direct reading gage and the quantity indicator in the flight compartment give the same indication.
(l)Pressurize the Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(m)Carry out an operational test of the hydraulic reservoir pressurizing system (Ref. 29-14-00, P. Block 501).

(5)Close-up.
(a)Remove the container and absorbent material.
(b)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(c)Remove the warning notices.
(d)Remove the access platform.
(e)Close the main landing gear doors (Ref. 32-12-11, P. Block 301).
(f)Close the cargo compartment doors (Ref. 52-33-00, P. Block 1).

(g)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

Removal/Installation of hydraulic tubes in pylon are dealt with in topic 29-12-69, P. Block 401.

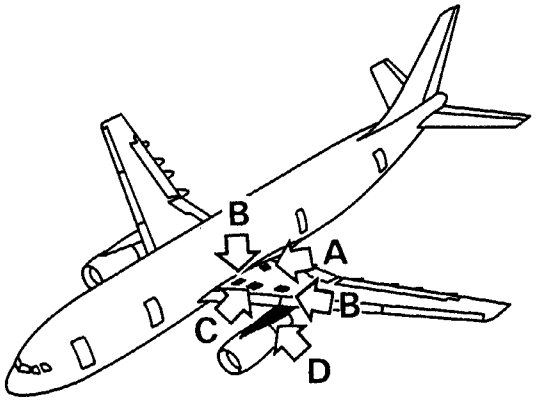
Removal/Installation of hydraulic tubes in pylon are dealt with in topic 29-12-69, P. Block 401.

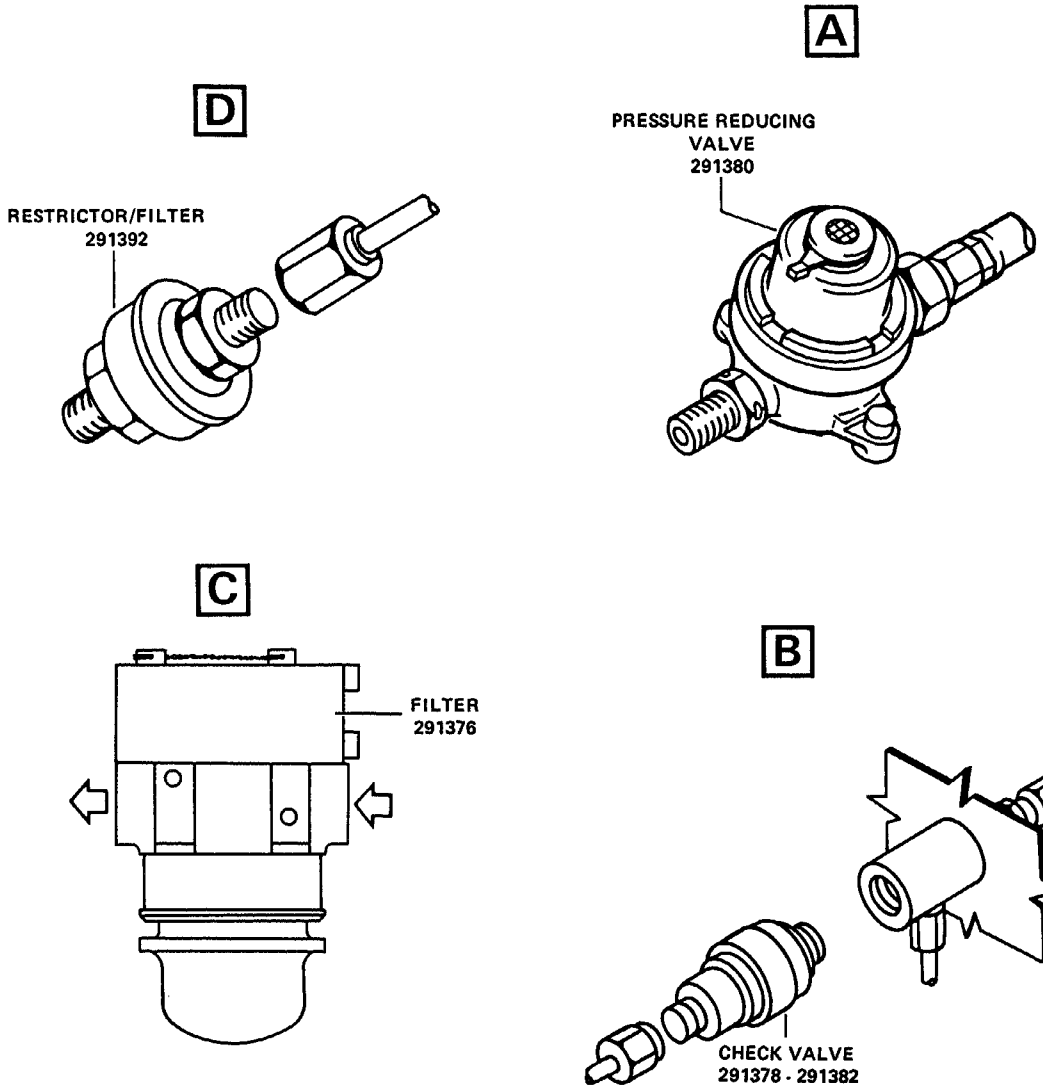
HYDRAULIC RESERVOIR PRESSURIZING SYSTEM - DESCRIPTION AND OPERATION

1. Purpose
   - To ensure in each hydraulic reservoir an air pressure of 3 to 3.5 bars (43.5 to 50.7 psi) relative so as to prevent cavitation of pumps on the ground and throughout the whole flight envelope.
   - To maintain the reservoir sufficiently air-tight in the event of failure of the pressurization system or after engine shut-down.

2. Component Location
   (Ref. Fig. 001)
   (Ref. Fig. 002)

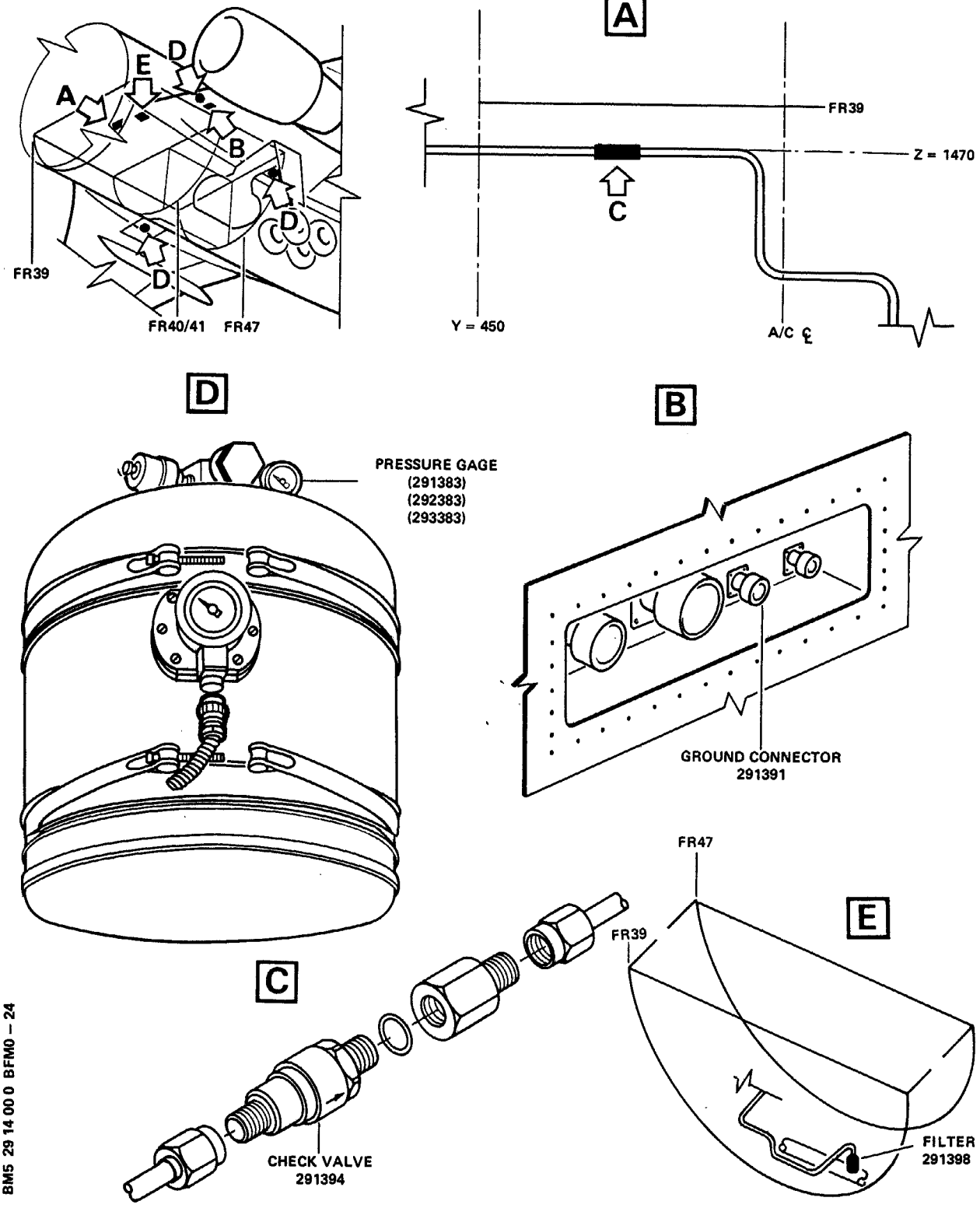
	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
R	291376	FILTER-RSVR PRESSURIZATION		571	571BB	29-14-13
	291378	CHECK VALVE-ENG1 PRESS LINE ISOL		571	571BB	29-14-14
R	291380	VALVE-PRESS REDUCING, ENG1 PRES-		571	571BB	29-14-12
R	291382	CHECK VALVE-ENG1 PRESS LINE ISOL		571	571BB	29-14-14
	291383	PRESS GAGE-RSVR AIR, G		147	734	29-14-33
	291391	GROUND CONNECTOR-RSVR PRESSURIZATION		571	571DB	29-14-21
	291392	RESTRICTOR/FILTER-PRESS LINE, ENG1		411		29-14-15
	291394	CHECK VALVE-APU PRESS LINE ISOL		143	147BZ	29-14-17
	291398	FILTER-RSVR PRESSURIZATION		143	147BZ	29-14-13





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Component Location
Figure 001



Component Location
Figure 002

3. Description
(Ref. Fig. 003)

R **ON A/C 101-200,

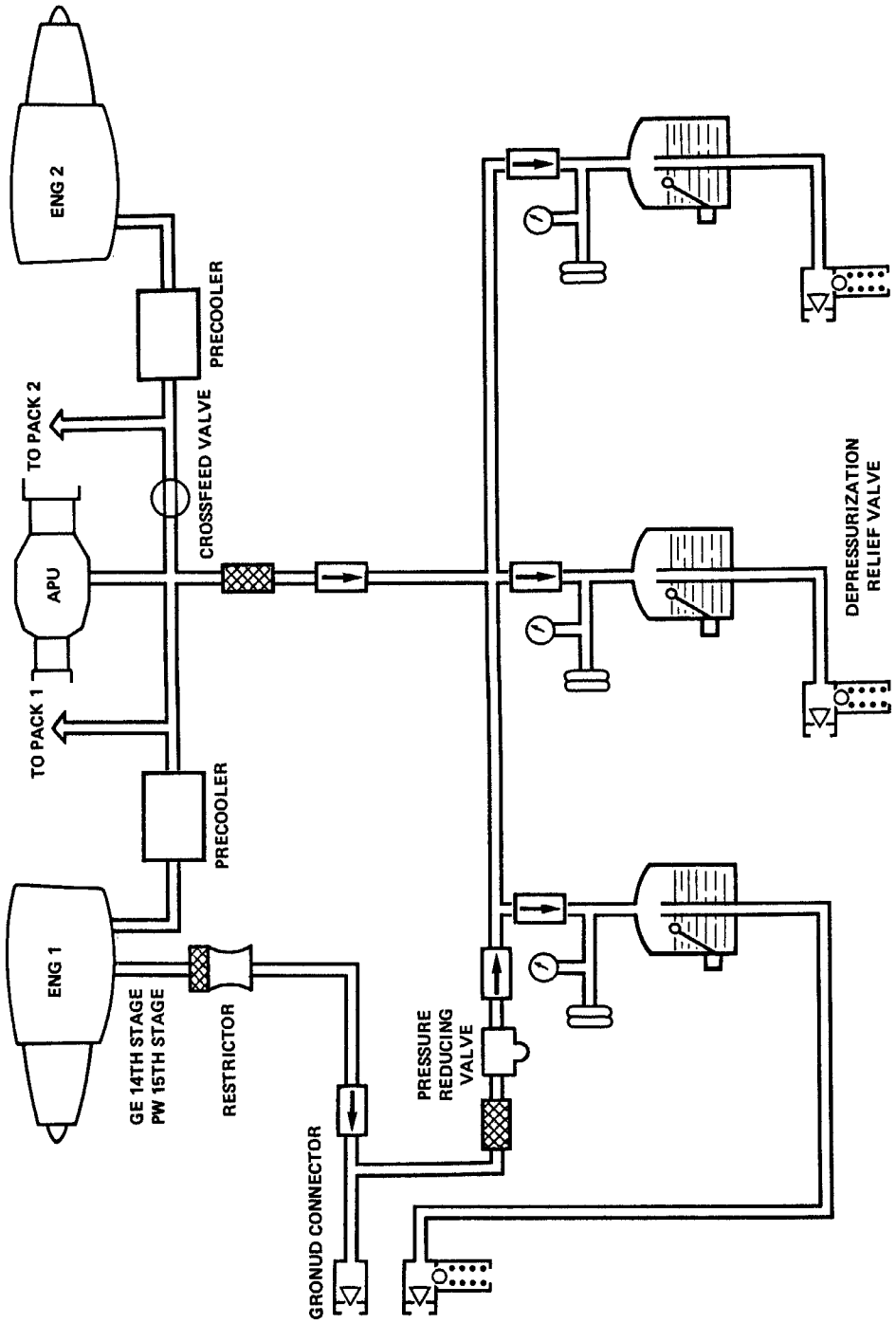
- The same system pressurizes the three hydraulic reservoirs by means of air bled from the 15 th stage (P & W engines) of the L engine HP com-compressor or from the air bleed system, or, when the engines are shut down, from the connector on the Blue system ground service panel. Bleeding air from the air bleed system offers the advantage of obtaining air from the APU either on the ground or during flight.

R **ON A/C 001-100,

- The same system pressurizes the three hydraulic reservoirs by means of air bled from the 14 th stage (GE engines) of the L engine HP compressor or from the air bleed system, or, when the engines are shut down, from the down, from the connector on the Blue system ground service panel. Bleeding air from the air bleed system offers the advantage of obtaining air from the APU either on the ground or during flight.

R **ON A/C ALL

- A depressurization/relief valve associated with each reservoir and located on the ground service panel of each system enables :
  . overpressure to be avoided in the reservoir by evacuation of air or fluid. Valve setting :
    4.2 + 0.3 - 0.2 bars, (60.9 + 4.3 - 2.9 psi) pressure increasing
    3.7 ± 0.1 bars, (53.6 ± 1.4 psi) pressure decreasing
  . each reservoir to be individually depressurized.
- A pressure reducing valve on the line from the L engine HP stage regulates pressure in the reservoir to 3.5 bars relative. Pressure reducing valve is set to 3.5 ± 01 bars (50 ± 1.4 psi)
- Maximum pressure delivered by the air bleed system is 3 bars. (43.5 psi).
- On each reservoir, a pressure switch warns the crew of low air pressure. Pressure switch setting :
  . 1.5 bars (21.7 psi) - pressure decreasing (warning activation)
  . 1.7 bars max (24.6 psi) - pressure increasing (warning de-activation).
- A restrictor, mounted in the pylon on the line from the L engine is intended to limit the air flow so as obtain an acceptable temperature in the event of rupture of the pressurization system in the wing or fuselage. The restrictor is protected by a filter incorporating a stainless steel metallic screen.
- A filter, equipped with a by-pass and by-pass opening indicator, is mounted in the wing, on the pressurization line from the L engine, upstream of the pressure reducing valve. This filter is intended to protect the pressure reducing valve and check valves from any contamination from the engine.
- The check valves mounted in the system and on the reservoir are of the flapper type.



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Hydraulic Reservoirs and Pressurization
Figure 003

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Hydraulic Reservoir Depressurization

CAUTION : IN ORDER TO AVOID CAVITATION, DO NOT OPERATE THE PUMPS OF A HYDRAULIC SYSTEM IF THE ASSOCIATED RESERVOIR IS DEPRESSURIZED.

A. Reason for the Job

(1)Depressurize hydraulic reservoirs.

B. Equipment and Materials

ITEM	DESIGNATION
(1)97A29102062000	Connector - Depressurizing Hydraulic Tank

C. Procedure

(Ref. Fig. 301)

(1)Job set-up

(a)Green system reservoir 291000

1 Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57

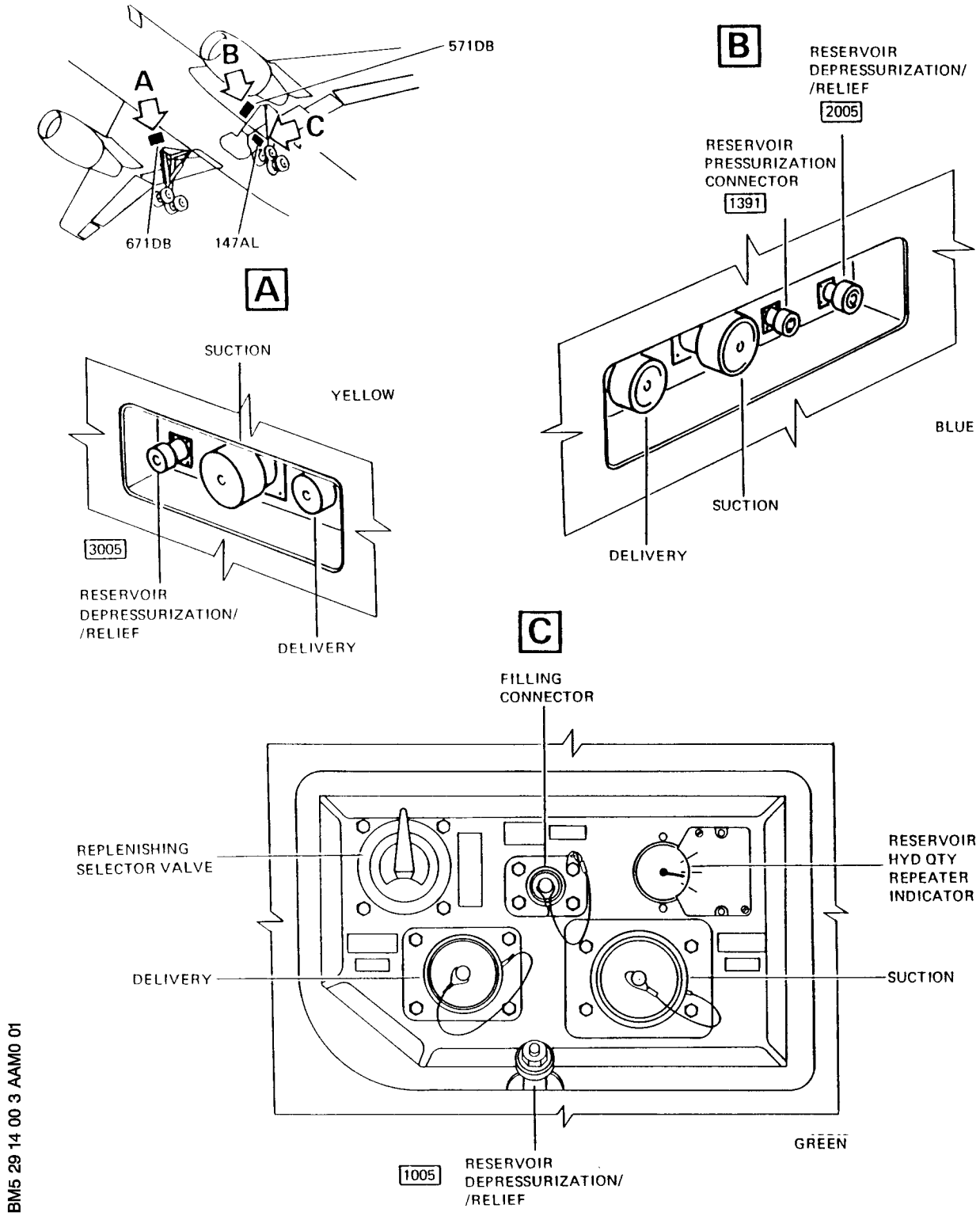
2 Open access door 147AL to ground connectors. Display a warning notice prohibiting pressurization of Green hydraulic system.

3 On HYD PWR panel 427VU, display a warning notice prohibiting operation of Green engine pumps and Green electric pumps.

(b)Blue system reservoir 292000

1 Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/B	1GL	332/U59
133VU	ENG1/PUMP CTL/B	31GJ	331/V57



Depressurization of Hydraulic Reservoirs
Figure 301

R

2 Open access door 571DB to ground connectors. Display a warning notice prohibiting pressurization of Blue hydraulic system.
3 On HYD PWR panel 427VU, display a warning notice prohibiting operation of Blue engine pump and of Green/Blue PTU.

(c)Yellow system reservoir 293000

1 Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	RAT/TEST	1GF	331/V59
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	ENG2/PUMP CTL/Y	1GD	332/U57

2 Open access door 671DB to ground connectors. Display a warning notice prohibiting pressurization of Yellow hydraulic system.
3 On HYD PWR panel 427VU, display a warning notice prohibiting operation of Yellow electric pump and of Green/Yellow PTU and of Yellow engine pump.
4 On mechanical center pedestal 9VU, display a warning notice prohibiting operation of Yellow electric pump controlling cargo compartment doors.
5 In hydraulics compartment in zone 148. Display a warning notice prohibiting operation of hand pump (3085).

(2)Depressurization of hydraulic reservoirs.

(a)Place hydraulic fluid recovery container under depressurizing equipment outlet line.
(b)Screw depressurizing equipment onto GREEN (BLUE) (YELLOW) SYS OVERPRESS ground connector.
(c)Aurally check that air has been evacuated from reservoir.

NOTE : If during a maintenance operation it is necessary to depressurize a hydraulic system reservoir, leave tool 97A29102062000 connected to concerned reservoir in order to avoid any inadvertent pressurization.
This tool will be removed once work is completed so as to allow tests to be performed.

(3)Close-Up

(a)Remove depressurizing equipment from GREEN (BLUE) (YELLOW) SYS OVERPRESS ground connector.
(b)Remove warning notice and screw protective cap onto GREEN (BLUE) (YELLOW) SYS/OVERPRESS ground connector.
(c)Close ground connector access doors.
(d)Remove warning notices from HYD PWR panel 427VU.
(e)Close the following circuit breakers :
- Green reservoir 291000 : 4GE, 31GJ, 99GK, 100GK and 1GD.
- Blue reservoir 292000 : 1GL and 31GJ
- Yellow reservoir 293000 : 6GL, 1GF, 7GX and 1GD.

(f)Remove all ground handling and maintenance equipment, standard and special tools together with ground power and replenishing equipment, all access equipment and miscellaneous items.

2. Hydraulic Reservoir Pressurization

WARNING : MAKE CERTAIN THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION. BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR AND THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

A. Reason for the Job

Pressurization of hydraulic reservoirs 291000, 292000 and 293000.

B. Equipment and Materials

ITEM	DESIGNATION
(1)97A29102035000	Connector - Pressurizing Hydraulic Tank
(2)	Compressed Air Cylinder
Referenced Procedures	
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 29-14-13, P. Block 301	Filter - RSVR Pressurization

C. Procedure

(1)Job set-up

(a)Open access door 571DB to Blue system ground connectors.

(b)Connect reservoir pressurizing equipment to AIR PRESSURE pressurization ground connector.

(c)Make certain that depressurizing equipment has been removed.

(d)Check that by-pass filter is not clogged (Ref. 29-14-13, P. Block 301).

(2)Pressurization of hydraulic reservoir system.

(a)Operate pressurizing equipment controls to deliver air at between 73 and 406 psi (5 and 28 bars) to reservoir pressurizing system.

(3)Close-up

(a)Check that pressure read on Green, Blue and Yellow pressure gages is 50 PSI (3.5 bars).

(b)Disconnect pressurizing equipment from AIR PRESSURE pressurization ground connector.

(c)Close access doors 571DB.

(d)Remove all ground handling and maintenance equipment, standard and special tools together with ground power and replenishing equipment, all access equipment and miscellaneous items.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT MAKE CERTAIN THAT GROUND SAFETIES, AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OR CONTROLS.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Operational Test

A. Reason for the Job
Test of hydraulic low air pressure annunciator lights.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System.

C. Procedure
(1)Job Set-Up
(a)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
132VU	ANN LT/TEST/MAN	1LP	324/L80
132VU	ANN LT/TEST/MAN	2LP	324/L81
132VU	ANN LT/TEST/MAN	149LP	324/L82
132VU	ANN LT/TEST/AUTO	153LP	323/M83
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58

(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)
Make certain that electronics racks ventilation is correct.
(c)In flight compartment, on HYD PWR panel 427VU, make certain that

pointers of the 3 hydraulic fluid quantity indicators are in the green range.

(d)Pressurize hydraulic system reservoirs (Ref. 29-14-00, P. Block 301)

(2)Operational Test

ACTION	RESULT
1. Pressure displayed on each hydraulic system reservoir pressure indicator must read 3.5 bars (51 psi) approx.	
2. In flight compartment, on AIR BLEED panel 436VU, place ANN LT switch in TEST position.	On panel 423VU the three LO AIR PRESS warning lights come on. Other warning lights are not to be taken into account.
3. Place ANN LT switch in BRT position.	The three LO AIR PRESS warning lights go off. Other warning lights are not to be taken into account

(3)Close-Up

De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R 2. Operational Test

A. Reason for the Job

R (1)Operational test of each hydraulic reservoir low air pressure detection and warning circuits.

CAUTION : IN ORDER TO AVOID PUMP CAVITATION DO NOT OPERATE THE PUMPS OF A HYDRAULIC SYSTEM IF THE ASSOCIATED RESERVOIR IS DEPRESSURIZED.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 52-33-00, P. Block 1	Cargo Compartment Door Hydraulic System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

C. Procedure

(1)Job Set-Up

(a)Make certain that cargo compartment doors are open, or open them if they are to be used whilst aircraft is on ground (Ref. 52-33-00, P. Block 1). To prohibit closing of doors, display warning notices on access doors to FWD and AFT cargo compartment selector control valves and on ACCU PRESS pushbutton switch.

(b)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL & CARGO DOOR/PUMP	7GX	333/T51

(c)Display warning notices prohibiting pressurization of hydraulic systems.

1 In flight compartment, on HYD PWR panel 427VU

2 On each hydraulic system ground connector (zone 147, 571, and 671).

(d)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) and leave main gear main door open.
Make certain that electronics racks ventilation is correct.

(e)Make certain that the following circuit breaker is closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/WARN	1GR	333/T58

(f)Open main landing gear doors (Ref. 32-12-11, P. Block 301).

(2)Test

R (a)Operational test

1 Depressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301).

ACTION	RESULT
1. Pressure displayed on each hydraulic system reservoir pressure indicator must read 3.5 bars (51 psi) approx.	
2. Slowly depressurize each hydraulic system reservoir until corresponding AIR legend comes on. Record reading on each hydraulic reservoir pressure indicator.	Reading on pressure indicator of each reservoir is 1.5 ± 0.1 bar (21.76 ± 1.45 psi). On left ECAM display unit HYD-GREEN and BLUE and YELLOW, RSVR LO AIR PRESS warning messages appear. On CAPT and F/O main instrument panels 3VU and 5VU. - MASTER CAUTION lights come on - Single chime is activated.
3. Slowly pressurize hydraulic system reservoirs until corresponding AIR legend goes off. Record reading on each hydraulic reservoir pressure indicator.	Reading on pressure indicator of each reservoir is 1.7 bar max. (24.66 psi max.). On left ECAM display unit HYD-GREEN and BLUE and YELLOW, RSVR LO AIR PRESS warning messages disappear. On CAPT and F/O main instrument panels 3VU and 5VU. - MASTER CAUTION lights go off

(3)Close-up

(a)De-energize the aircraft electrical network (Ref. 24-42-00, P. Block 301).

(b)Pressurize hydraulic system reservoir to 3.5 bars (51 psi) (Ref. 29-14-00, P. Block 301).

(c)Close circuit breakers 1GD, 4GE, 31GJ, 99GK, 100GK, 1GL, 6GL and 7GX.

(d)Remove warning notices and close cargo compartment doors (Ref 52-33-00 P.Block 301).

(e)Remove all ground handling and maintenance equipment, standard and special tools together with ground power and replenishing equipment, all access equipment and miscellaneous items.

(f)Close main landing gear doors (Ref. 32-12-11, P. Block 301).

3. System Test

A. Reason for the Job

(1)Test of hydraulic low air pressure annunciator lights (Ref : operational
R test of paragraph 1).
R (2)Test of each hydraulic reservoir low air pressure detection
R and warning circuits (Ref. operational test of paragraph 2).
(3)Test of pressure reducing valve and leakage test of reservoirs.

CAUTION : IN ORDER TO AVOID PUMP CAVITATION, DO NOT OPERATE THE PUMPS OF A HYDRAULIC SYSTEM IF THE ASSOCIATED RESERVOIR IS DEPRESSURIZED.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Compressed Air Source Equipped with Pressure Reducing Valve Delivering 4 to 28 bars (58 to 406 psi) with Pressure Gage and Shut-off Valve.
B.	Blanking Caps/Plugs.
C.	Access Platform, 2.6m (8ft. 8in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening).
- 52-33-00, P. Block 1	Cargo Compartment Doors Hydraulic System
- 71-13-00, P. Block 301	Cowl Doors

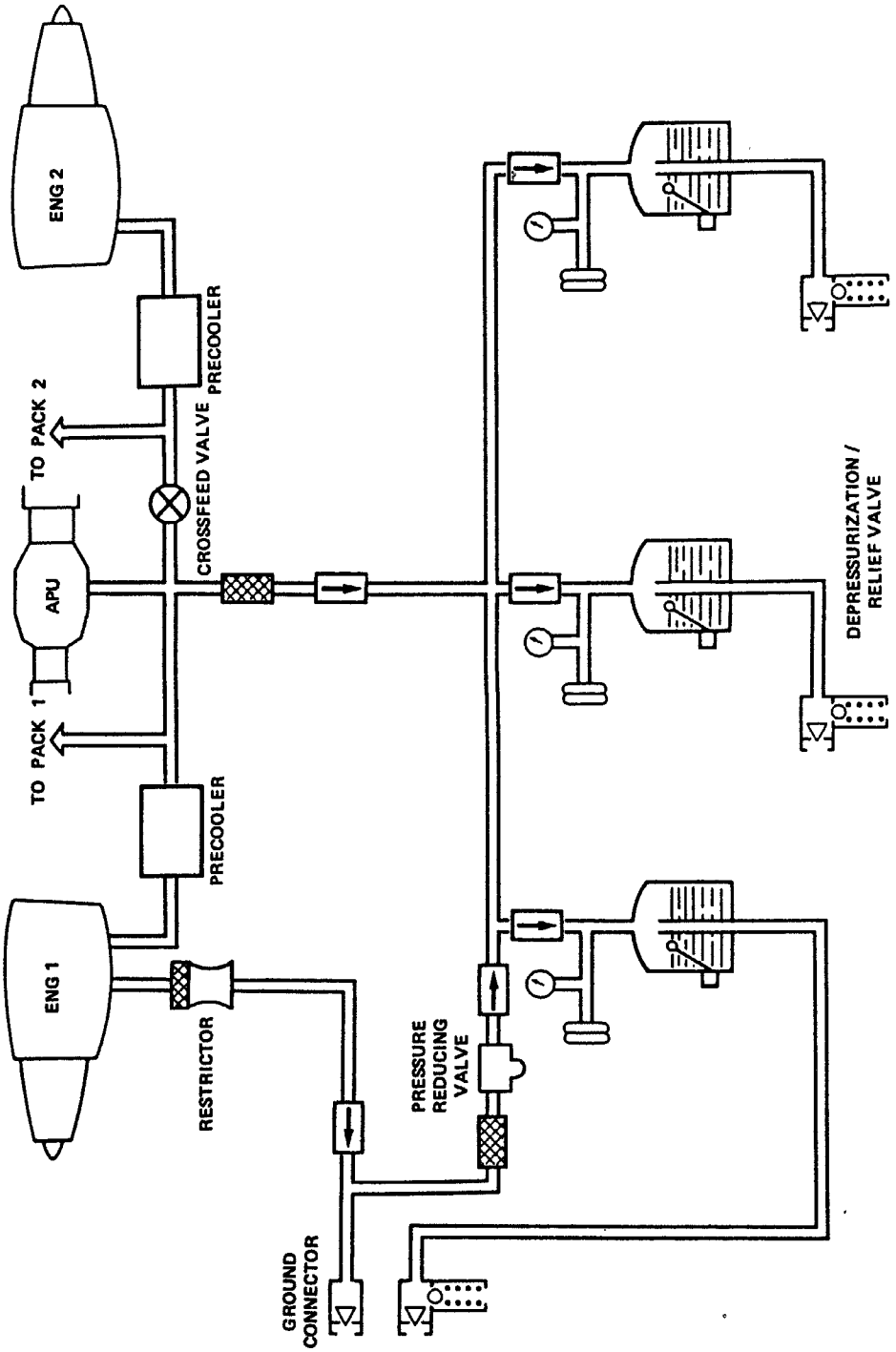
C. Procedure

(1)Job Set-Up
(Ref. Fig. 501)
(a)Make certain that all cargo compartment doors are open or open them if they are to be used whilst aircraft is on ground. (Ref. 52-33-00, P. Block 1). Prohibit their closing by displaying warning notices on FWD and AFT cargo compartment selector control valves and on ACCU PRESS pushbutton switch.
(b)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301). Leave left main gear main door in open postion.
(c)Depressurize the three hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(d)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	ELEC/PUMPS/WARN/&CTL	4GE	331/V60
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	PTU CTL/G/B	1GL	332/U59

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL&CARGO DOOR/PUMP	7GX	333/T51

(e) Display warning notices prohibiting hydraulic reservoir and hydraulic system pressurization.
  1 In flight compartment, on HYD PWR panel 427VU.
  2 On green, Blue and Yellow system ground connectors.
(f) Open left engine cowl doors (Engine 1) (Ref. 71-13-00, P. Block 301).
(g) On engine 1 pylon :
  1 Under spar cap at level of firewall, disconnect air bleed line downstream of restrictor 291392 (point 1).
  2 Install blanking cap/plug on restrictor (point 2)
  3 On disconnected pipe connect compressed air cylinder equipped with adjusting equipment and pressure gage.
(h) Open main landing gear doors (Ref. 32-12-11, P. Block 301).



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Hydraulic Reservoir Pressurizing System.
Figure 501

(2)Test

(a)Test of pressure reducing valve 291380.

ACTION	RESULT
1. On each reservoir pressure indicator make certain that pressure is at zero.	
2. Using compressed air cylinder, progressively apply a pressure of 4 bars (58 psi) and then 28 bars (406 psi)	On Green, Blue and Yellow system reservoir (1383, 2383 and 3383) pressure indicator stabilized pressure must be equal to 3.5 bars (51 psi) approx.
3. Shut down pressurization. Depressurize the three hydraulic reservoirs (Ref. 29-14-00, P. Block 301)	Reading on each pressure indicator must be at zero.
4. Using compressed air cylinder, apply a stabilized pressure of 3.5 bars (51 psi)	Reading on each reservoir pressure indicator must be equal 3.5 bars (51 psi) approx.

(b)Hydraulic reservoir system leakage tests.

ACTION	RESULT
1. Using compressed air cylinder, apply a stabilized pressure of 3.5 bars (51 psi).	Reading on each reservoir pressure indicator must be equal to 3.5 bars (51 psi).
2. Isolate pressurized system from compressed air cylinder	After 1 hour 30 minutes, pressure drop read on each reservoir pressure indicator must be $\leq$ 0.15 bar (2.17 psi)

(3)Close-Up

(a)Remove compressed air cylinder and associated equipment.
(b)Remove blanking cap/plug from restrictor 291392.
(c)Connect pressurization line to restrictor 291392.
(d)Close left engine cowl doors (Ref. 71-13-00, P. Block 301).
(e)Close left main gear main door (Ref. 32-12-11, P. Block 301).
(f)Close circuit breakers 1GD, 4GE, 31GJ, 99GK, 100GK, 1GL, 6GL and 7GX.
(g)Close cargo compartment doors (Ref. 52-33-00, P. Block 1).
(h)Remove warning notices, all ground handling and maintenance equipment, standard and special tools together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(j)De-energize the aircraft electrical network (Ref. 24-41-00,

P. Block 301).

1. Reason for the Job
Check of hydraulic system pressurization when aircraft must be grounded for more than 36 hours.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Access Platform, 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening

3. Procedure

A. Job Set-Up
(1)On panel 427VU, display a warning notice prohibiting operation of Green, Blue and Yellow hydraulic systems.
(2)Position access platform and open main landing gear door (Ref. 32-12-11, P. Block 301).

B. Check
(1)On each hydraulic tank
(a)Make certain that pressure read on tank pressure gage is equal to or higher than 1.5 bar (21.7 psi).
NOTE : This check will be performed after 12 hours aircraft grounding time.
(b)Make certain that fluid level has not increased.
(2)If pressure read on one pressure gage is lower than 1.5 bar (21.7 psi) tank check valve (291388 or 292388 or 293388) must be replaced. If air leakage is suspected, we recommend draining the hydraulic reservoir to a minimum level of 5 liters.
(a)Whenever this pressure drop results in an increase in fluid level, system must be bled before the next flight as instructed below.
(b)Pressurize hydraulic system of concerned tank (Ref. 29-10-00, P. Block 301).
(c)Actuate elevator controls until level in tank is stabilized.
(d)Top-up hydraulic tank if required (Ref. 12-12-29, P. Block 1).

C. Close-Up
(1)Close main gear door (Ref. 32-12-11, P. Block 301).
(2)Remove access platform.
(3)Remove warning notices.

PRESSURE REDUCING VALVE 29 (1380) - REMOVAL/INSTALLATION

CAUTION : IN ORDER TO AVOID PUMP CAVITATION, DO NOT OPERATE THE PUMPS OF A HYDRAULIC SYSTEM IF THE ASSOCIATED RESERVOIR IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A. 97A29102062000	Connector-Depressurizing, Hydraulic Tank
B. 97A29102035000	Connector-Pressurizing, Hydraulic Tank
C.	Compressed Air Cylinder
D.	Blanking Plugs/Caps
E.	Access Platform, 2.6 m (8 ft. 7 in.)
Referenced Procedures	
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

2. Procedure

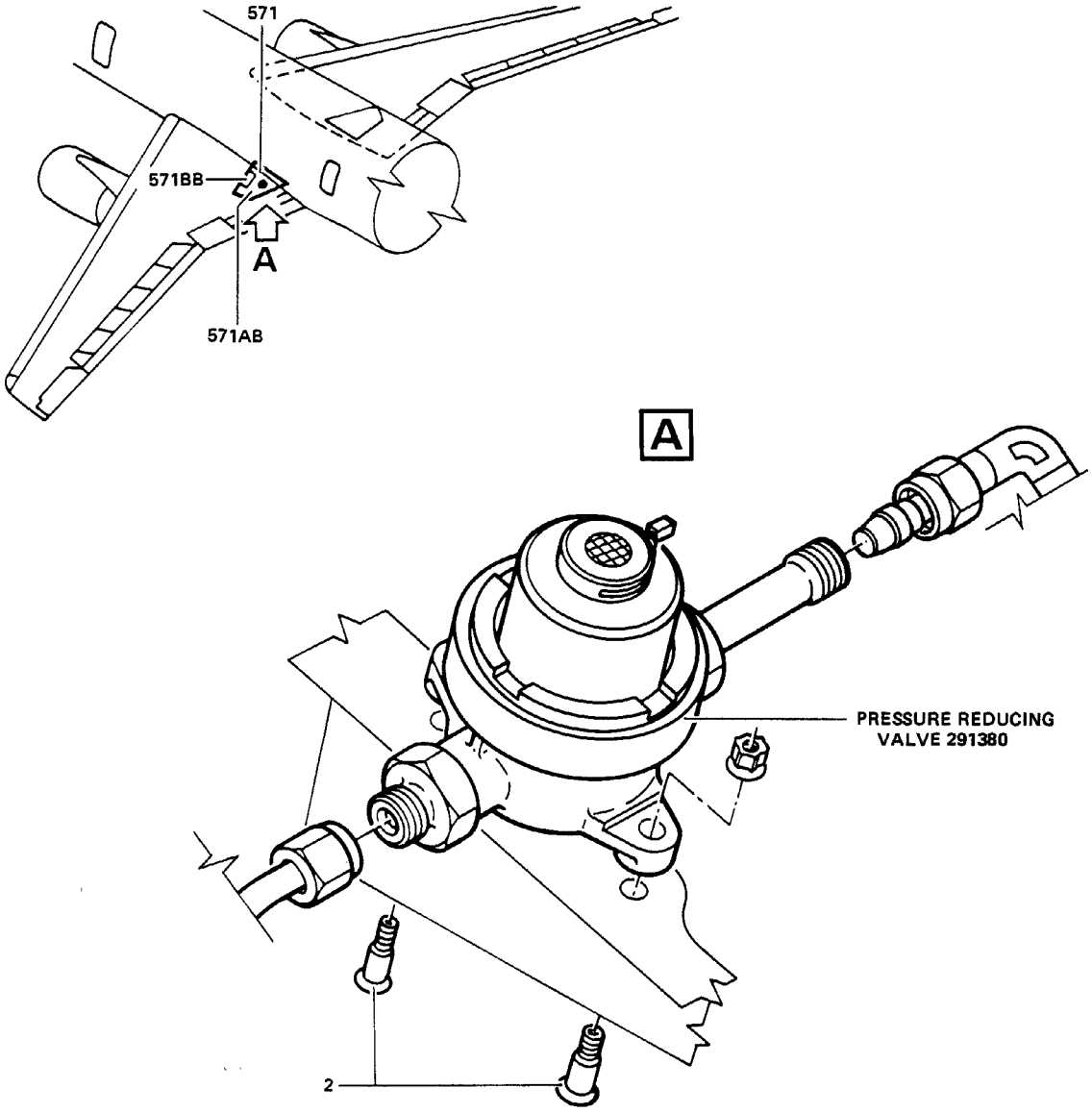
A. Job Set-Up
(1)Position access platform under zone 571.
(2)Depressurize the three hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
R (3)Open access door 571BB.
(4)Install warning notice, prohibiting pressurization of hydraulic reservoirs, on hydraulic ground connector 1391.
(5)On Green (access door 147AL), Blue (access door 571DB), Yellow (access doors 671DB) ground connectors, display warning notices prohibiting pressurization of hydraulic systems.
(6)Open right main landing gear door (Ref. 32-12-11, P. Block 301) and in zone 148, display warning notice prohibiting operation of hand pump (Frame 54)
(7)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(Ref. Fig. 401)

B. Removal
(1)Disconnect lines, cap/plug open line ends (fittings) and component threaded unions.
(2)Remove the two attachment bolts (2)
(3)Remove pressure reducing valve.

C. Preparation of Replacement Component
(1)Disconnect inlet and outlet unions from removed component.
(2)Clean unions and check for correct condition.
(3)Install unions, equipped with new seals, on replacement component.



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Pressure Reducing Valve 291380
Figure 401

D. Installation
(1)Position replacement pressure reducing valve on its mount.
(2)Secure pressure reducing valve with the two bolts (2).
(3)Connect lines.

E. Test
(1)Remove warning notice from hydraulic ground connector 1391 and pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(2)Check unions of pressure reducing valve 1380 for leakage (soapy water).
(3)Check that direct reading air pressure gage on each reservoir indicates 3.5 bars (50 psi).

F. Close-Up
(1)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
R (2)Close access door 571BB.
(3)Remove access platforms.
(4)Remove safety clips and tags and close circuit breakers 4GE and 7GX.

RESERVOIR PRESSURIZATION FILTER (291376) - SERVICING

1. General

The filter unit consists of a light alloy body to which a light alloy filter bowl containing a disposable filter element, is screwed.
The filter head has a built-in bypass facility in the event of filter clogging.
Filter clogging is indicated by a pop out indicator protruding from the filter body.
The pop out indicator is located above the filter outlet port.
An arrow engraved on the filter body indicates airflow direction.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 7 in.)
Referenced Procedures - 29-14-13, P. Block 401	Reservoir Pressurization Filters (291376-291398) Removal/Installation

3. Procedure

A. Job Set-Up
(1)Position access platform.

B. Clogging Check
(1)On filter head, check that pop out indicator does not protrude.
(2)If pop out indicator protrudes perform removal/installation of filter element (Ref. 29-14-13, P. Block 401).

C. Close-Up
(1)Close main landing gear door (Ref. 32-12-11, P. Block 301).
(2)Remove access platform.

RESERVOIR PRESSURIZATION FILTER 291376 - 291398) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Reason for the Job
Removal of filter element for cleaning or replacement.

2. Equipment and Materials

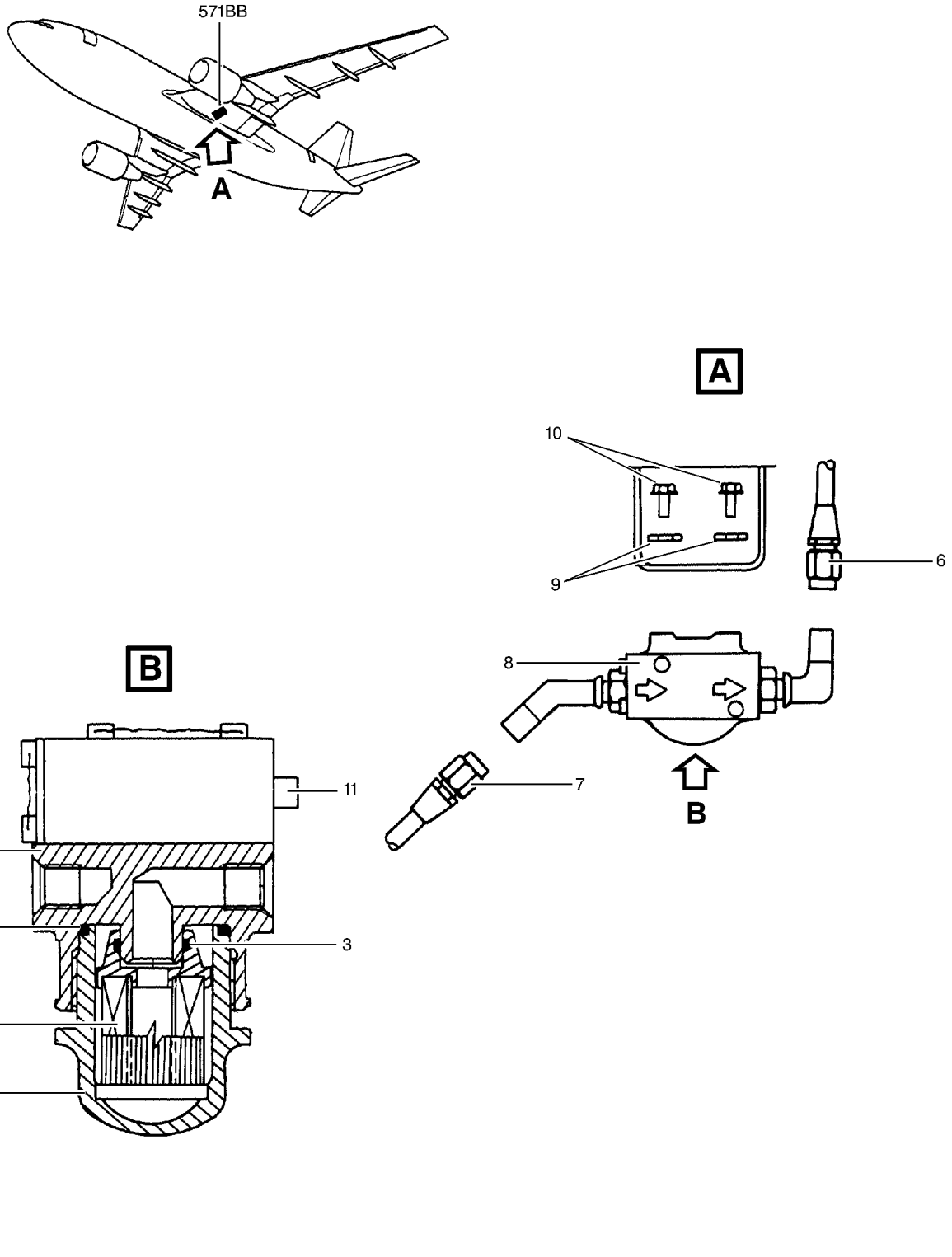
ITEM	DESIGNATION
A.	Access Platform, 2.60 m (8 ft. 8 in.)
B.	O-Rings Seals
C.	Lockwire - Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in.)
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 49-00-00, P. Block 501	Airbone Auxiliary Power

3. Procedure

A. Job Set-Up
(1)Open main gear main door (Ref. 32-12-11, P. Block 301).
(2)Position access platform.
(3)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(4)Depressurize the three hydraulic reservoirs (29-14-00, P. Block 301).
(5)In flight compartment, display warning notices prohibiting pressurization of pneumatic system.

B. Removal of Filter 291376
(Ref. Fig. 401)
R (1)Open access door 571BB.
(2)Removal of filter assembly (8).
(a)Unscrew unions (6) and (7).
(b)Remove and retain the two bolts (10) and washers (9).
(c)Remove filter assembly (8).
(3)Removal of filter element (4).
(a)Cut and remove lockwire from filter bowl (5).
(b)Unscrew bowl (5) from filter head (1), discard O-Ring (2).
(c)Remove filter element (4).
NOTE : Two types of filter elements have been fitted. One type cannot be re-used. Take care not to discard the other re-usable metallic element.

C. Preparation of Replacement Component
(1)Clean re-usable filter element and install new O-ring (3).



Filter 291376

R Figure 401

D. Installation
(1)Installation of filter element (4).
(a)Install new O-ring (2) on filter bowl (5).
(b)Install filter element (4) in bowl (5).
(c)Tighten bowl (5) home - Maximum torque : 1.5 m.daN (11.07 lbf. ft.).
(d)Safety bowl (5) to body (1) with lockwire.
(e)Press in red clogging indicator button (11) if protruding.
(2)Installation of filter assembly (8).
(a)Install filter assembly using bolts (10) and washers (9).
(b)Tighten unions (6) and (7).

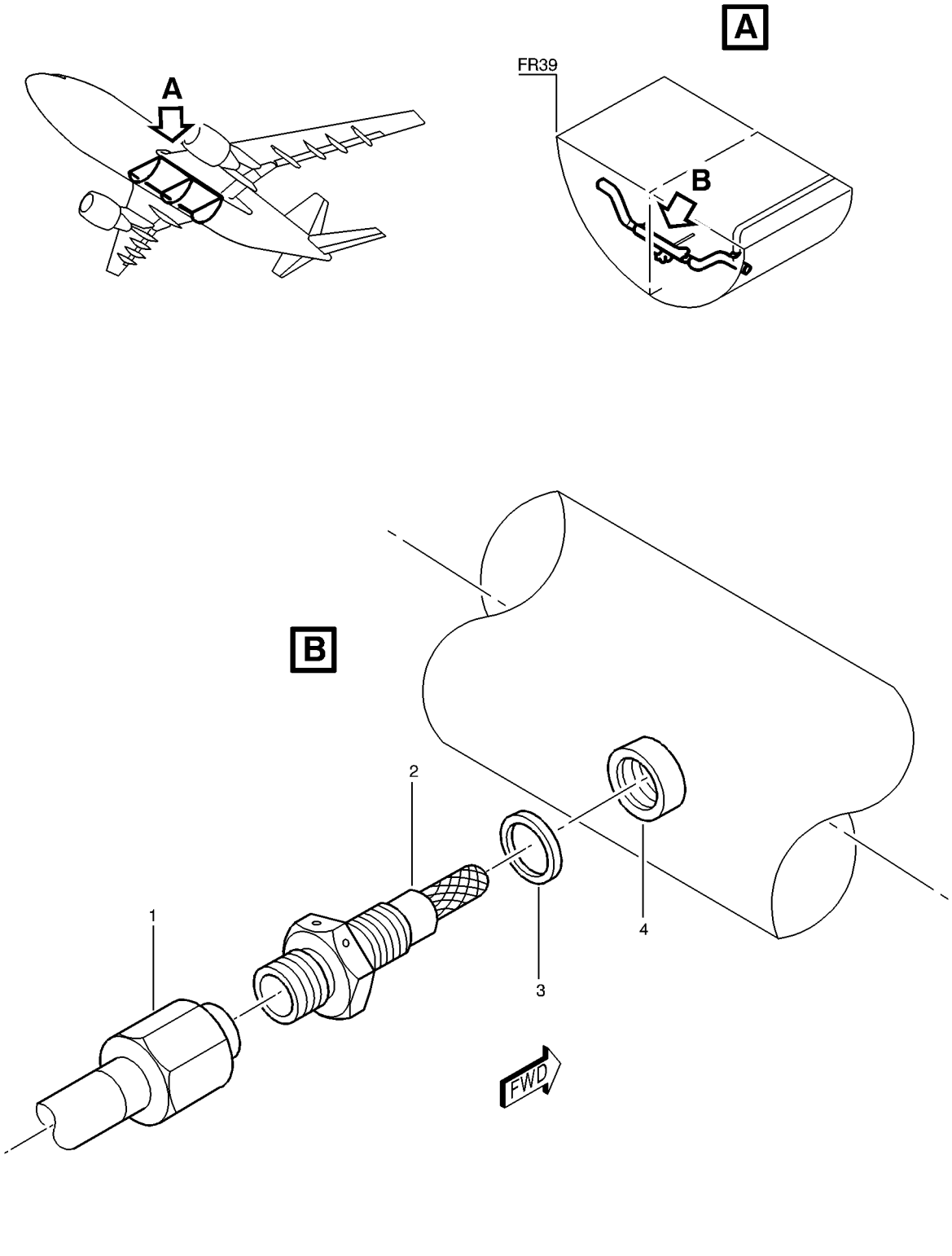
E. Removal of Filter 291398
R (Ref. Fig. 402)
R (1)Open access door 147BZ.
R (2)Unscrew union (1).
R (3)Unscrew filter (2) from base (4).
R (4)Remove filter (2), discard seal (3).

R F. Preparation of Replacement Component
R (1)Clean filter or replace filter as necessary.

R G. Installation
R (1)Screw filter (2) with new seal (3) on base (4).
R (2)Screw union (1) on filter (2).

R H. Test
R (1)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
R (2)Check for leaks around filter (1376) during pressurization.
R (3)Pressurize hydraulic reservoir by means of APU pneumatic power
R (Ref. 49-00-00, P. Block 501, Para.4.).
R (4)Check for leaks around filter (1398) during pressurization.

R I. Close-Up
R (1)Remove warning notices.
R (2)Close access door.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE
R CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE
R THE ACCESS DOORS/PANELS AT FR47.
R (a)Close access door 147BZ and/or 571BB as necessary.
R (3)Close main gear main door (Ref. 32-12-11, P. Block 301).
R (4)Remove access platform.



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Filter 291398
Figure 402

R

ENG1 PRESSURIZATION LINE ISOLATION CHECK VALVE (291378-291382)
REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 7 in.)
B.	Warning Notice
Referenced Procedures	
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

R NOTE : As removal/installation procedure is identical for both check valves, only one procedure is described.

A. Job Set-Up

R (1)Install access platform.
(2)On center pedestal
R - Install warning notice prohibiting operation of aileron control wheels and trim switches.
(3)Depressurize hydraulic reservoir system (Ref. 29-14-00, P. Block 301).
(4)On ground hydraulic connectors, display warning notices prohibiting pressurization of hydraulic reservoirs and hydraulic systems.
R - On HYD PWR panel 427VU, display warning notice prohibiting pressurization of hydraulic systems.
R - In zone 812 (FR 54), display warning notice prohibiting operation of hand pump 29 (3085).

B. Removal

R (1)Remove union (1).
(2)Unscrew check valve (2) from coupling (4). Remove check valve (2) and discard O-ring (3).

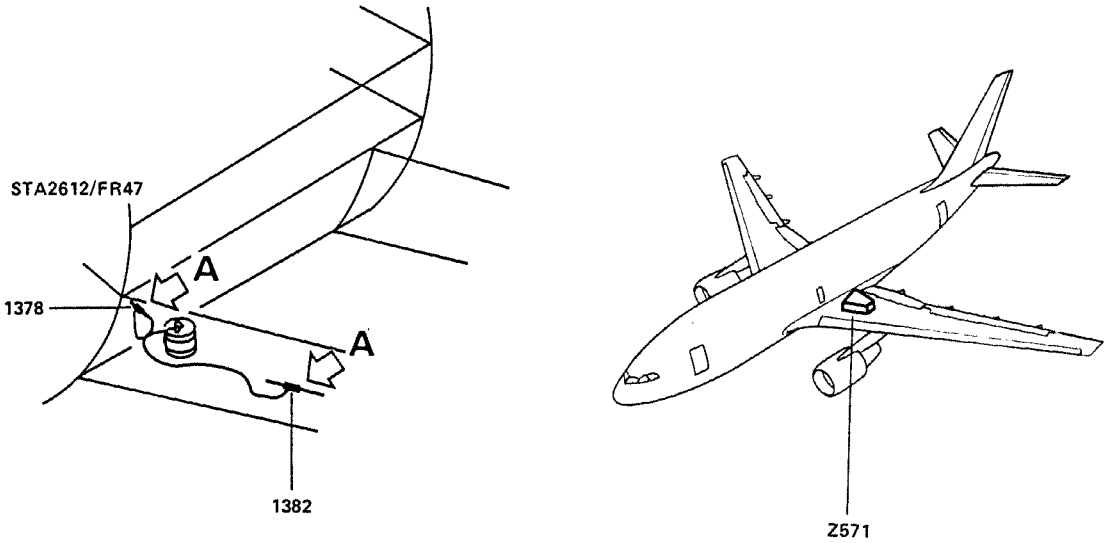
C. Installation

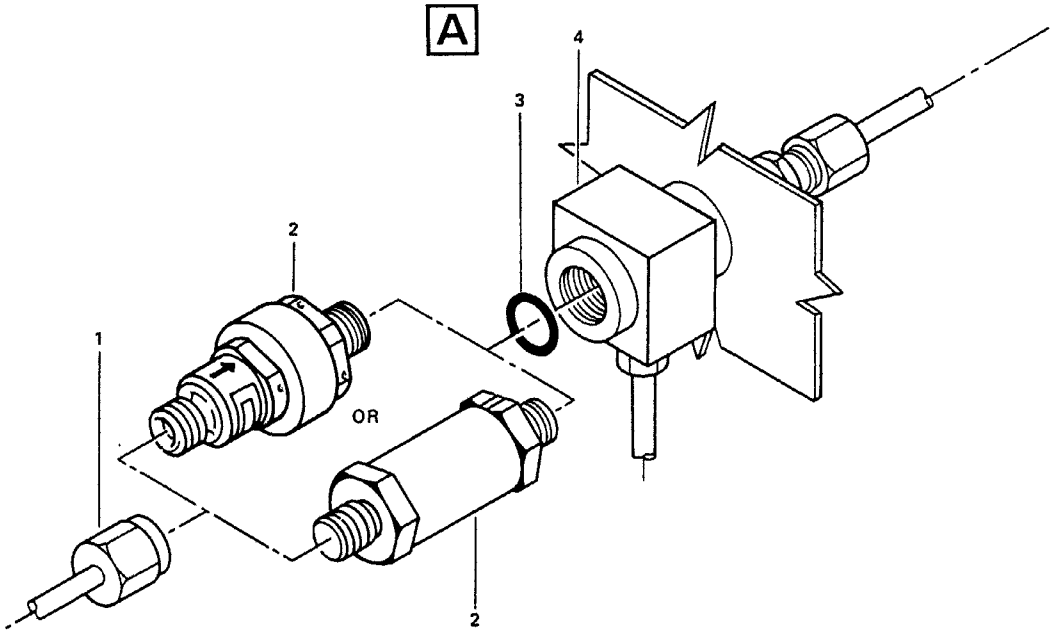
NOTE : If a "CRISSAIR" check valve is installed, the indication of the built-in hinge shall be at the top.

R (1)Screw check valve (2) equipped with new O-ring (3) onto coupling (4).
R (2)Tighten union (1) on check valve (2).
R

R D. Close-Up

R (1)Pressurize hydraulic reservoir system (Ref. 29-14-00, P. Block 301).
R (2)Make certain that there are no leaks at couplings.
R (3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (4)Remove access platform.
R (5)Remove warning notice(s).





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Check Valves 291378, 291382
Figure 401

PRESSURIZATION LINE RESTRICTOR, ENG 1 - REMOVAL/INSTALLATION

1. Reason for the Job

A. Removal/Installation of filter/restrictor assembly for replacement of the filter element.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Access Platform 2.50 m (8 ft. 2 in.) Air - Hydraulic Tool Kit
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power-Pressurization/ Depressurization
R - 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-Up
(1)Depressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301).
(2)Display warning notices prohibiting pressurization of the three hydraulic systems :
- in flight compartment, on panel 427VU
- on ground connectors.

**ON A/C 101-200,

(3)Open fan and fan thrust reverser cowls (Ref. 71-13-00, P. Block 301).
(4)Install access platform.

B. Removal
NOTE : Removed unions shall be blanked with plugs.

**ON A/C 001-100,

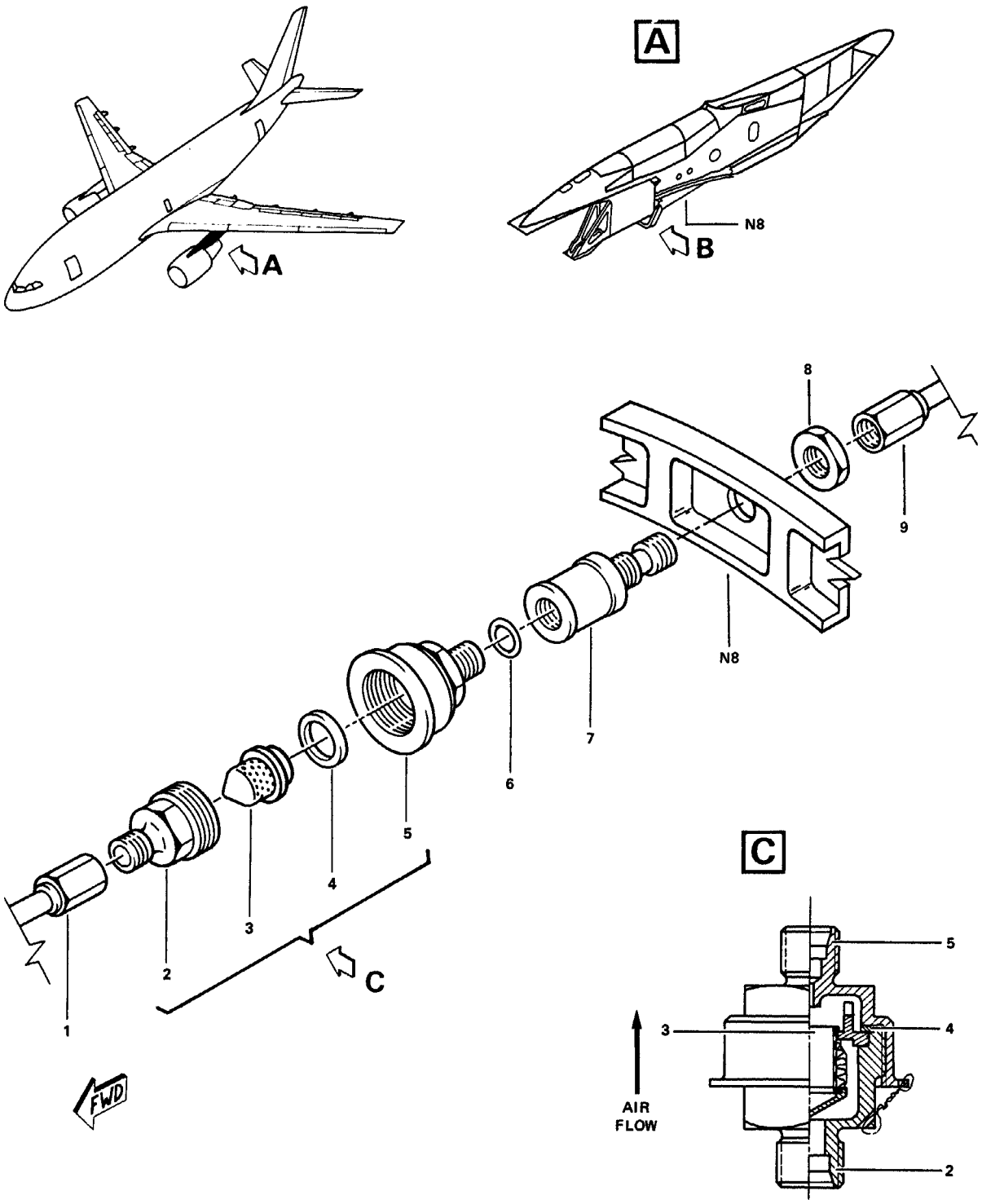
(3)Open core cowl (Ref. 71-13-00, P. Block 301).
(4)Install access platform.

B. Removal
NOTE : Removed unions shall be blanked with plugs.

**ON A/C 101-200,

(Ref. Fig. 401)

**ON A/C 001-100,



Filter/Restrictor on Reservoir Pressurization Line
Figure 401

(Ref. Fig. 402)

**ON A/C ALL

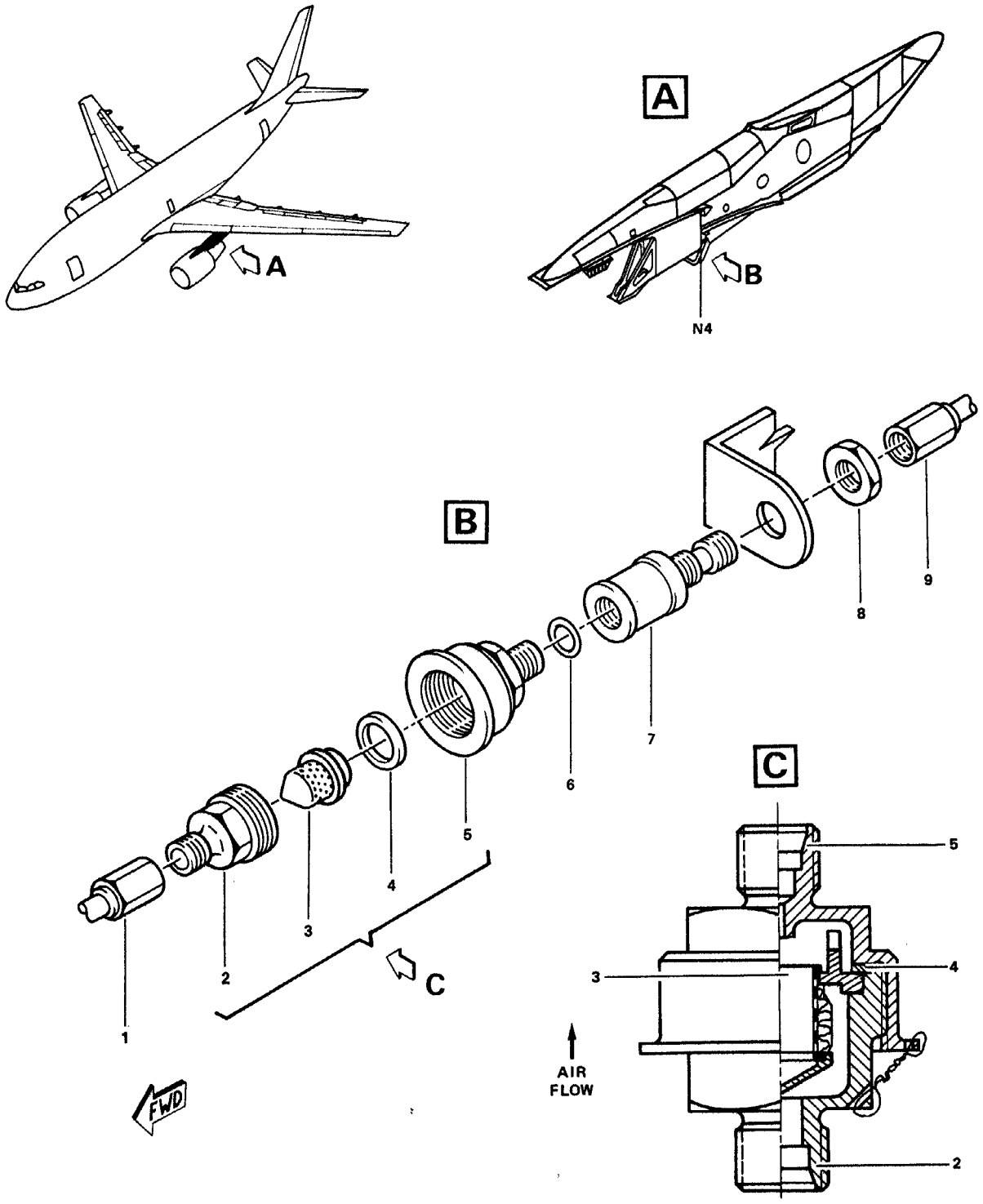
(1)Untighten and remove union (1).
(2)Untighten and remove union (9).
(3)Untighten and remove nut (8) from union thereby disengaging filter/restrictor assembly from engine mounting bracket.
(4)Withdraw filter/restrictor assembly and union towards front taking care not to damage thread of union (7).
(5)Unscrew and remove union (7) from filter/restrictor assembly. Discard seal (6) and protect thread.
(6)Cut and remove lockwire from filter/restrictor assembly.
R (7)Unscrew half body (2) from half body (5). Remove filter (3) and discard seal (4).

R C. Preparation of Replacement Component
R (1)Make certain that the two half bodies are clean and have no cracks, corrosion or other damage. If necessary clean with a lint-free cloth.
R (2)Make certain that the filter (3) is clean and has no deformation, cracks, evidence of impact or loose wires inside and outside.
R NOTE : If the filter is dirty, clean it in overhaul facility or replace it with a new or a clean one.
R (3)Install a new seal (4) on filter (3) and insert assembly into half body (5).
R (4)Screw half body (2) to half body (5). TORQUE to between 1.8 and 2.1 m.daN (13.27 and 15.49 lbf.ft.).
R (5)Safety half bodies with lockwire.
R (6)Install union (7) with new seal (6) on filter/restrictor assembly (on half body (5) side). TORQUE to between 1.5 and 1.7 m.daN (11 and 12.5 lbf.ft.).

D. Installation
(1)Engage filter/restrictor assembly equipped with union (7) into engine mounting bracket.
(2)Screw nut (8). TORQUE to 1.5 m.daN (11 lbf.ft.).
(3)Screw union (1). TORQUE to between 2 and 2.3 m.daN (14.7 and 16.9 lbf.ft.).
(4)Screw union (9). TORQUE to between 1.5 and 1.7 m.daN (11 and 12.5 lbf.ft.).

R E. Test
R (1)Start the engine (Ref. 71-00-00, P. Block 501) to pressurize the reservoir.
R (2)Stop the engine (Ref. 71-00-00, P. Block 501).
R (3)On each pressure gage of the reservoir, check that the pressure is approx 3.5 bars (50 psi).
R (4)Make sure that there are no leaks at the pressurization line restrictor.

R F. Close-Up



Filter/Restrictor on Reservoir Pressurization Line
Figure 402

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close engine cowls (Ref. 71-13-00, P. Block 301).
(4)Remove warning notices from flight compartment and hydraulic ground connectors.

APU PRESSURIZATION LINE ISOLATION CHECK VALVE (291394) REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.60 m (8 ft. 7 in.)
B.	Warning Notices
Referenced Procedures	
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 49-00-00, P. Block 501	Airborne Auxiliary Power

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up
(1)Open left main gear main door (Ref. 32-12-11, P. Block 301).
(2)Install access platform.
(3)On center pedestal :
- display a warning notice prohibiting operation of flap and slat control lever.

On air generation and temperature control section of overhead panel :
- Display a warning notice prohibiting starting up of refrigeration unit packs.

(4)Depressurize hydraulic reservoir system (Ref. 29-14-00, P. Block 301).
(5)Display warning notices prohibiting :
- on hydraulic ground connectors, pressurization of hydraulic reservoirs and systems.
- on HYD PWR panel 427VU, pressurization of hydraulic systems.
- in Zone 812 (FR54), operation of hand pump (293085).

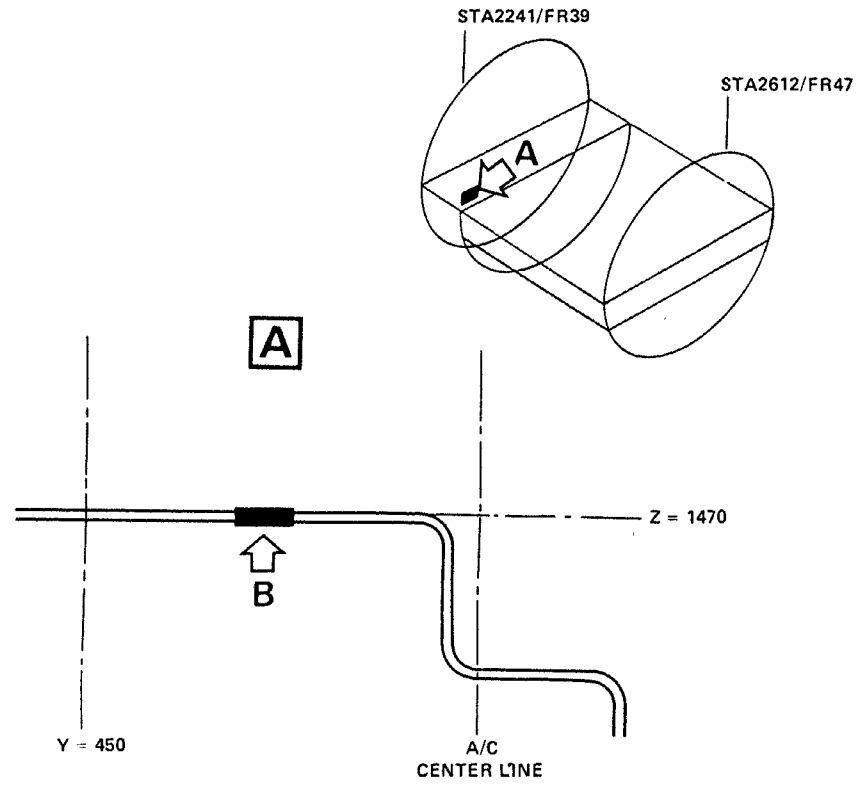
(6)Open access door 147BZ.

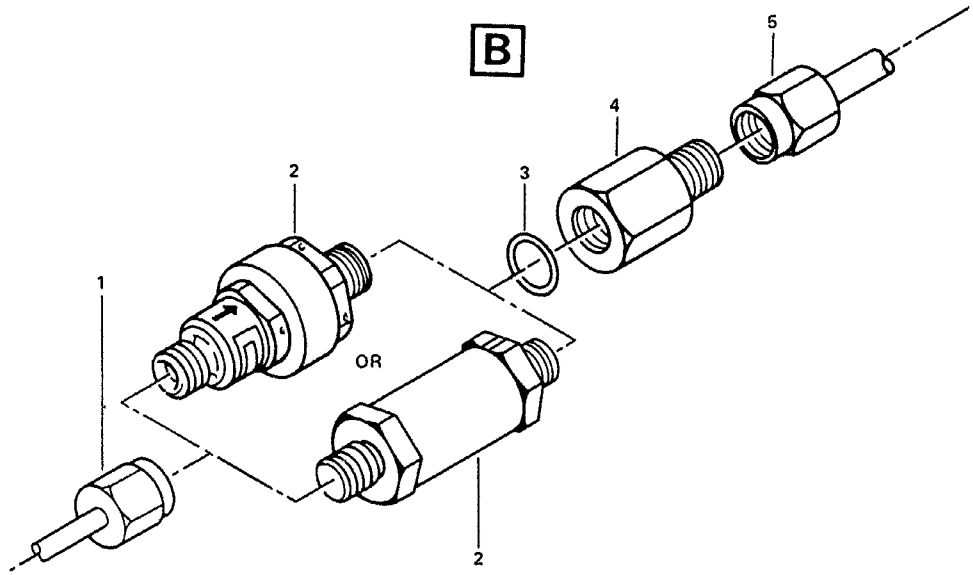
B. Removal
(1)Remove the two couplings (1,5)
(2)Remove check valve (2)

C. Preparation of Replacement Component
(1)Remove union coupling (4) from check valve (2). Discard O-ring (3).
(2)Install new O-ring (3) and install union coupling (4) on new check valve (2).

D. Installation
NOTE : If a "CRISSAIR" check valve is installed, the indication of the built-in hinge shall be at the top.
(1)Install check valve (2), arrow pointing towards right side of aircraft center line.
(2)Install couplings (1, 5)

E. Test





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Check Valve 291394
Figure 401

R (1)Start the APU (Ref. 49-00-00, P. Block 501).
R (2)On the AIR BLEED panel 436VU :
R - Put the APU BLEED switch to the ON position.
R (3)Make certain that there are no leaks around check valve (291394).

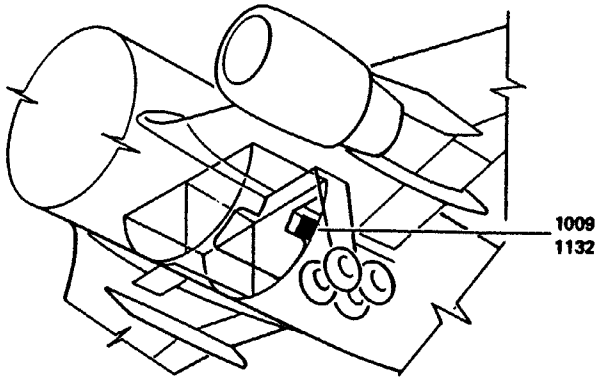
F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door.
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/PANELS AT FR47.
(a)Close access door 147BZ.
(3)Remove access platform.
(4)Close left main gear main door (Ref. 32-12-11, P. Block 301).
(5)Remove warning notices.

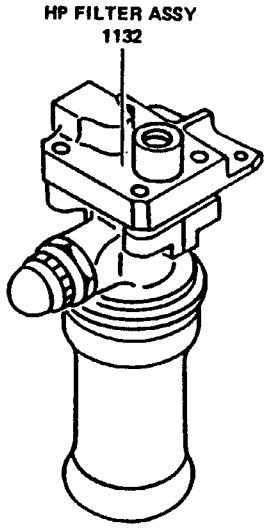
HYDRAULIC RESERVOIR FILLING - DESCRIPTION AND OPERATION

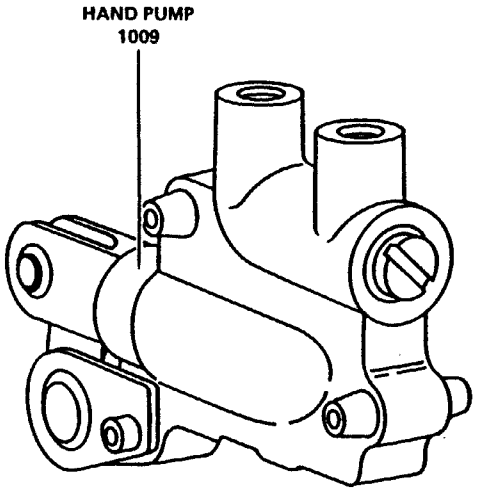
1. Purpose
   Refilling or topping-up of the reservoirs, normally pressurized, on the ground.

2. Component Location
   (Ref. Fig. 001)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	1009	HAND PUMP-RSVR FILLING		144	734	29-16-15
R	1132	FILTER-RSVR FILLING		147	734	29-16-11







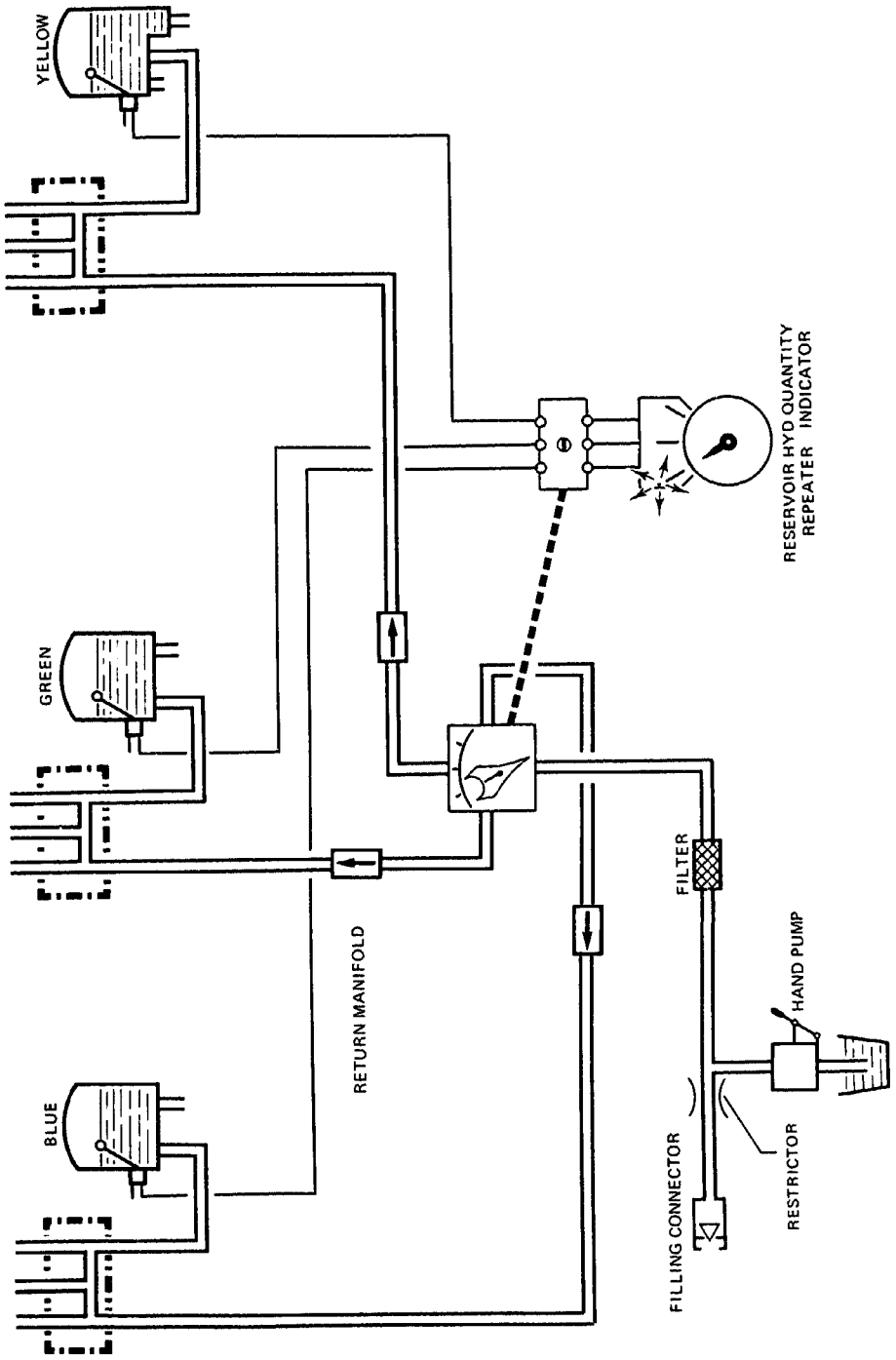
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Component Location
Figure 001

3. Description and Operation

(Ref. Fig. 002)

- A single device enables the three reservoirs to be filled from the Green system ground service panel which includes :
  . A self-sealing connector for connection of a ground replenishing unit
  . A Green, Blue or Yellow filling manual selector
  . A reservoir hydraulic quantity repeater
  . An indicator showing which reservoir has been selected.
- A restrictor in the aircraft system limits the fluid flow rate from the replenishing unit to avoid overpressure in the reservoirs and facilitate reading of level indication.
- A hand pump located inside the fuselage behind the Green system ground service panel also enables the selected reservoir to be filled from a can through a pipe stowed in a sleeve adjacent to the pump.
- Fluid is supplied to the reservoir through ;
  . A filter with a capability of 3 to 15 μ absolute
  . The reservoir selector
  . The return manifold equipped with a check valve
  . The system return filter adjacent to the reservoir.



Hydraulic System Filling
Figure 002

RESERVOIR FILLING FILTER 291132 - SERVICING

1. Reason for the Job

A. Replacement of Filter Element

2. Equipment and Materials

ITEM	DESIGNATION
A.	Compressed Air Cylinder
B.	Access Platform 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 12-12-29, P. Block 1	Hydraulics

3. Procedure

(Ref. Fig. 301)

A. Job Set-Up

(1)Open left main gear main door (Ref. 32-12-11, P. Block 301).
(2)Open access door 147AL to ground connectors and display a warning notice prohibiting connection of replenishing unit and pressurization of reservoir filling system.
(3)Make certain that reservoir filling manual selector is in neutral position.

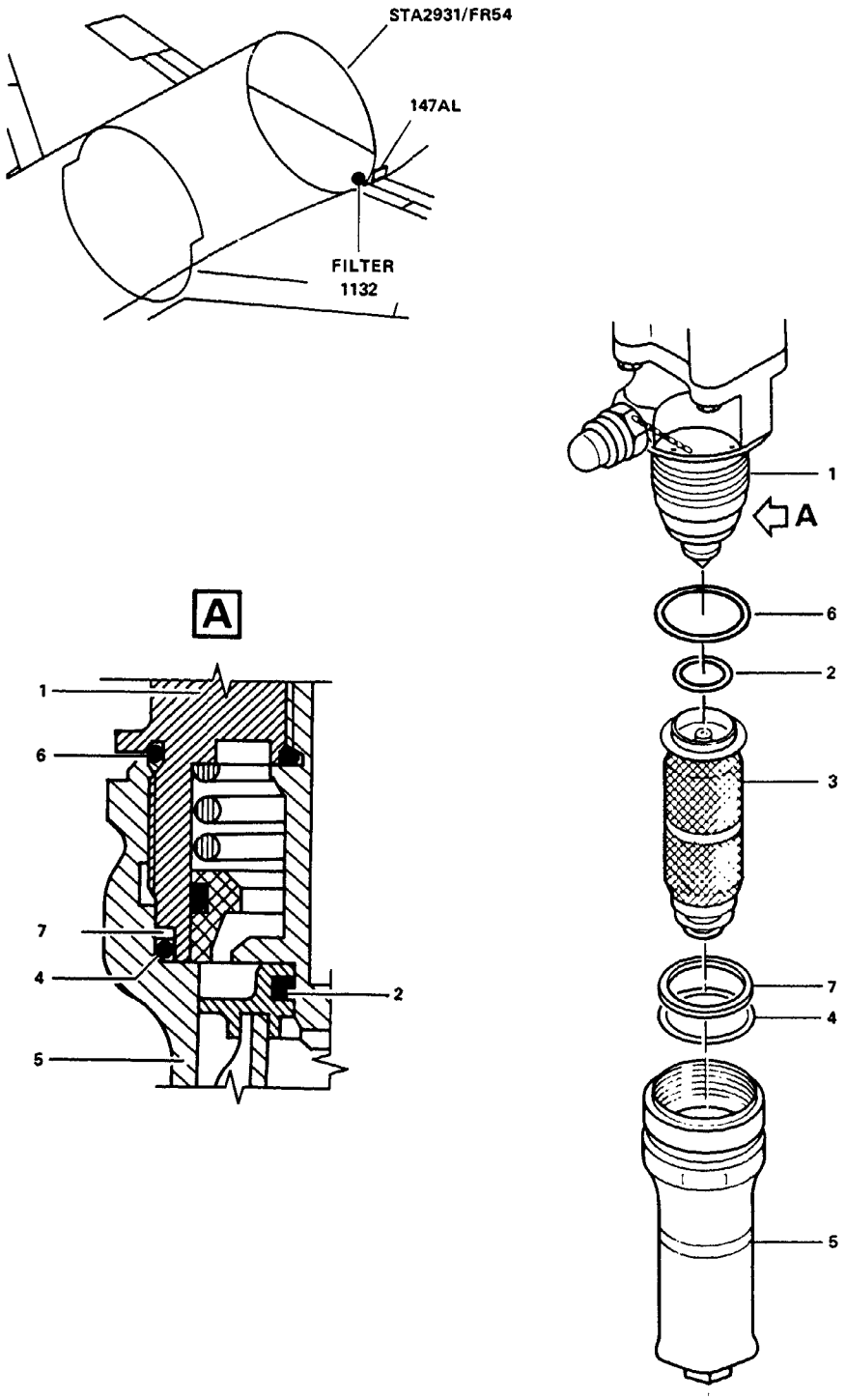
B. Removal

(1)Cut and remove lockwire between filter head (1) and bowl (5).
(2)Unscrew bowl (5).
(3)Discard O-ring (6) from filter head (1).
(4)Discard O-ring (4) and remove back-up ring (7).
(5)Remove filter element (3) from bowl (5) and discard O-ring (2).
Note : If filter element (3) is re-usable and if it cannot be cleared immediately after removal, immerse it in hydraulic fluid after having blanked its outlet port.
Make certain that back-up ring (7) is in correct condition.

C. Installation

CAUTION : INSTALL NEW OR RECONDITIONED FILTER ELEMENT. FOR A RE-USABLE FILTER ELEMENT, CLEANING MUST BE PERFORMED IN AN ULTRASONIC TANK AND BE FOLLOWED BY A PERFORMANCE TEST. BEFORE INSTALLATION, NEW O-RINGS MUST BE COATED WITH HYDRAULIC FLUID.

(1)Install new O-ring (4) and back-up ring (7) on bowl (5).
(2)Install new O-ring (2) on filter element (3).
(3)Install filter element (3) in bowl (5), previously cleaned then dried with clean and dry compressed air.
(4)Install new O-ring (6) on filter head (1).
(5)Position bowl/filter element assembly under filter head (1).
(6)Tighten bowl (5) home. MAXIMUM TORQUE : 4 m.daN (30 lbf. ft).



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Filter 291132 - Replacement of Element
Figure 301

(7)Wirelock bowl (5).
(8)Press clogging indicator if protruding.

D. Tests
(1)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(2)Top up (Ref. 12-12-29, P. Block 1).
(3)Check filter for leakage.

E. Close-Up
(1)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(2)Close access door 147AL to ground connectors.
(3)Close left main gear main door (Ref. 32-12-11, P. Block 301).

LP RESTRICTOR VALVE 291139 - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs
B.	Container
C.	Warning Notices
D.	Access Platform 2.6 m (8 ft. 8 in.)

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

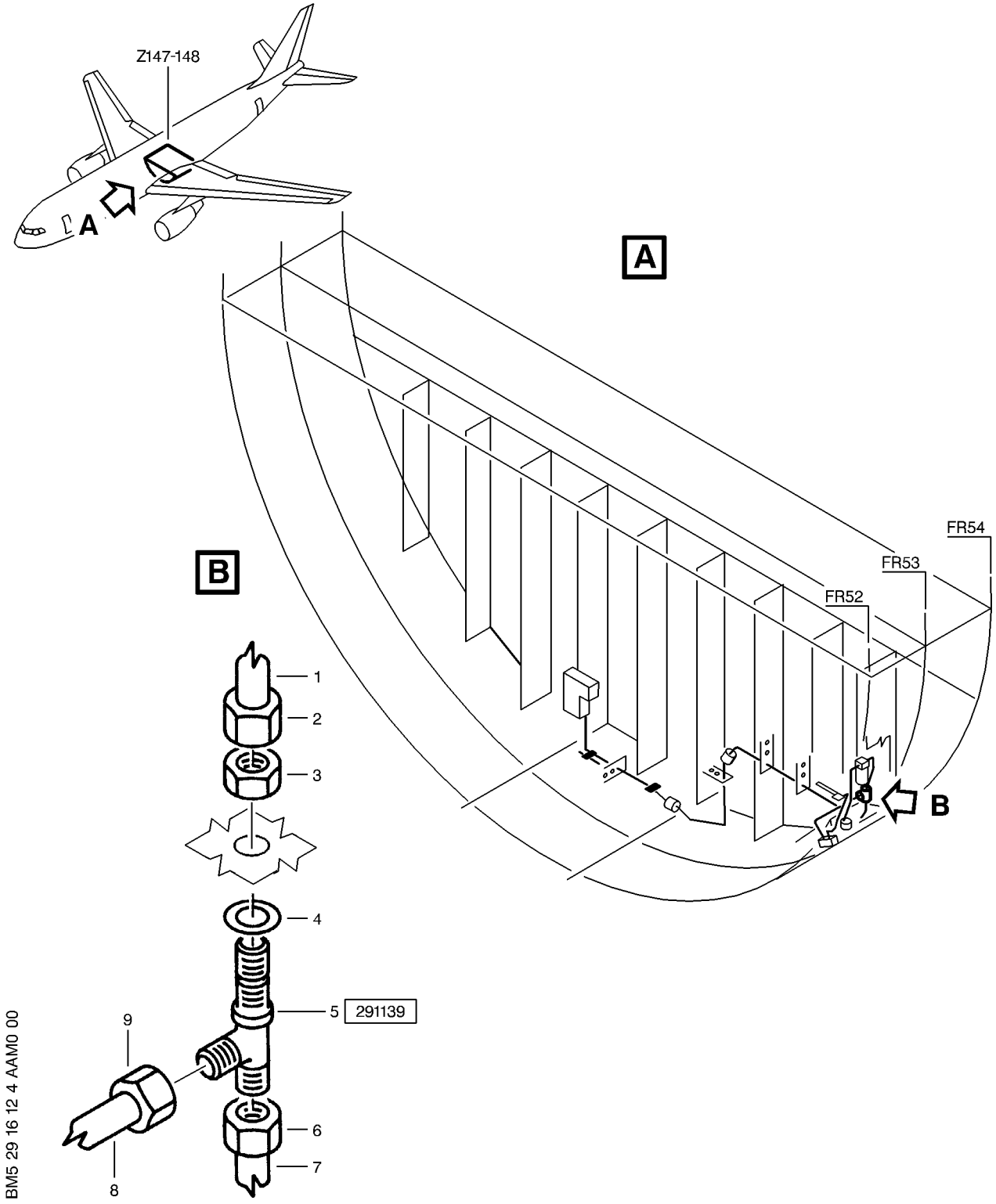
2. Procedure

A. Job Set-Up
(1)Open left main gear main door (Ref. 32-12-11, P. Block 301).
(2)Open access door 147AL to ground connectors and display a warning notice prohibiting connection of replenishing unit and pressurization of reservoir filling system.
(3)Make certain that reservoir filling manual selector is in neutral position.
(4)Install access platform.
(5)Place a container under the restrictor.
(6)On panel 427VU :
- Display a warning notice prohibiting operation of Green, Blue and Yellow systems.

(Ref. Fig. 401)

B. Removal
(1)Loosen nuts (2), (6) and (9).
(2)Disconnect lines (1), (7) and (8) from restrictor (5).
(3)Loosen nut (3) and remove washer (4) and restrictor (5).
(4)Install blanking plugs on disconnected line ends and restrictor ports.

C. Installation
(1)Make sure that the parts retained from the removed component are clean and in correct condition.



LP Restrictor Valve
Figure 401

(2)Remove blanking plugs from disconnected line ends and restrictor ports.
(3)Install restrictor (5) with washer (4) and nut (3).
(4)Connect lines (1), (7) and (8) on restrictor (5).
(5)Tighten nut (3).
(6)TORQUE nuts (2), (6) and (9) to between 1.21 and 1.32 m.daN (107.07 and 116.81 lbf.in).

D. Test

(1)Remove warning notices.
(2)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(3)Check level of hydraulic fluid in reservoir and top up if required (Ref. 12-12-29, P. Block 1).
(4)Visually check for hydraulic fluid leakage at the connections.

E. Close-up

(1)Remove container.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access door 147AL.
(4)Close left main gear main door (Ref. 32-12-11, P. Block 301).
(5)Remove access platform.

RESERVOIR FILLING HAND PUMP 29 1009 - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.60 m (8 ft. 8 in.)
B.	Blanking Plugs/Caps
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 29-00-00, P. Block 301	Hydraulic Power

2. Procedure

A. Job Set-Up
(1)Open left main landing gear door (Ref. 32-12-11, P. Block 301).
(2)Install access platform.
(3)Open access door 147AL and check that hydraulic reservoir filling manual selector is in NEUTRAL position.

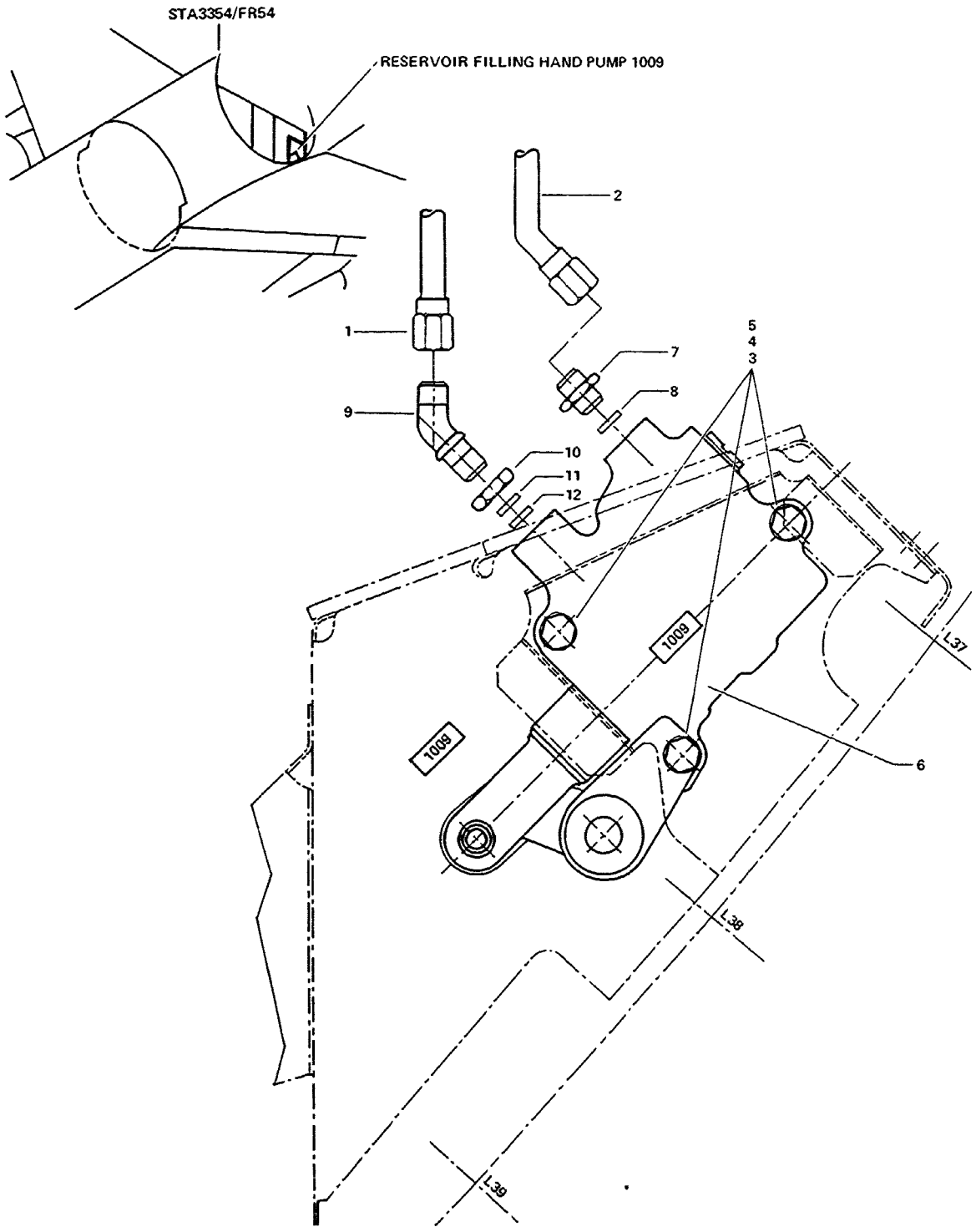
B. Removal
(Ref. Fig. 401)
(1)Place absorbant material under unions.
(2)Unscrew unions (1) and (2). Cap open line ends.
(3)Remove and retain the three screws (3), washers (4) and bolts (5).
(4)Remove pump (6). Cap open pump ports.

C. Preparation of Replacement Component
(1)Check that replacement hand pump is fitted with unions (7) and (9). If not, install union (7) with O-ring (8) and union (9) with O-ring (12), back-up ring (11) and jam nut (10). Tighten union (7).

D. Installation
(1)Position hand pump (6).
(2)Attach with screws (3), washers (4) and bolts (5).
(3)Remove all blanking caps. Connect and tighten union (2).
(4)Connect union (1), tighten jam nut (10). Tighten union (1).

E. Test
(1)Partially drain one hydraulic reservoir (Ref. 29-00-00, P. Block 301).
(2)Top-up using hand pump (Ref. 12-12-29, P. Block 1). Check unions for absence of leaks.

F. Close-Up
(1)Remove absorbant material and wipe off all traces of hydraulic fluid.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove access platform.
(4)Close left main landing gear door (Ref. 32-12-11, P. Block 301).



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Reservoir Filling Hand Pump 291009
Figure 401

1. General

(Ref. Fig. 001)

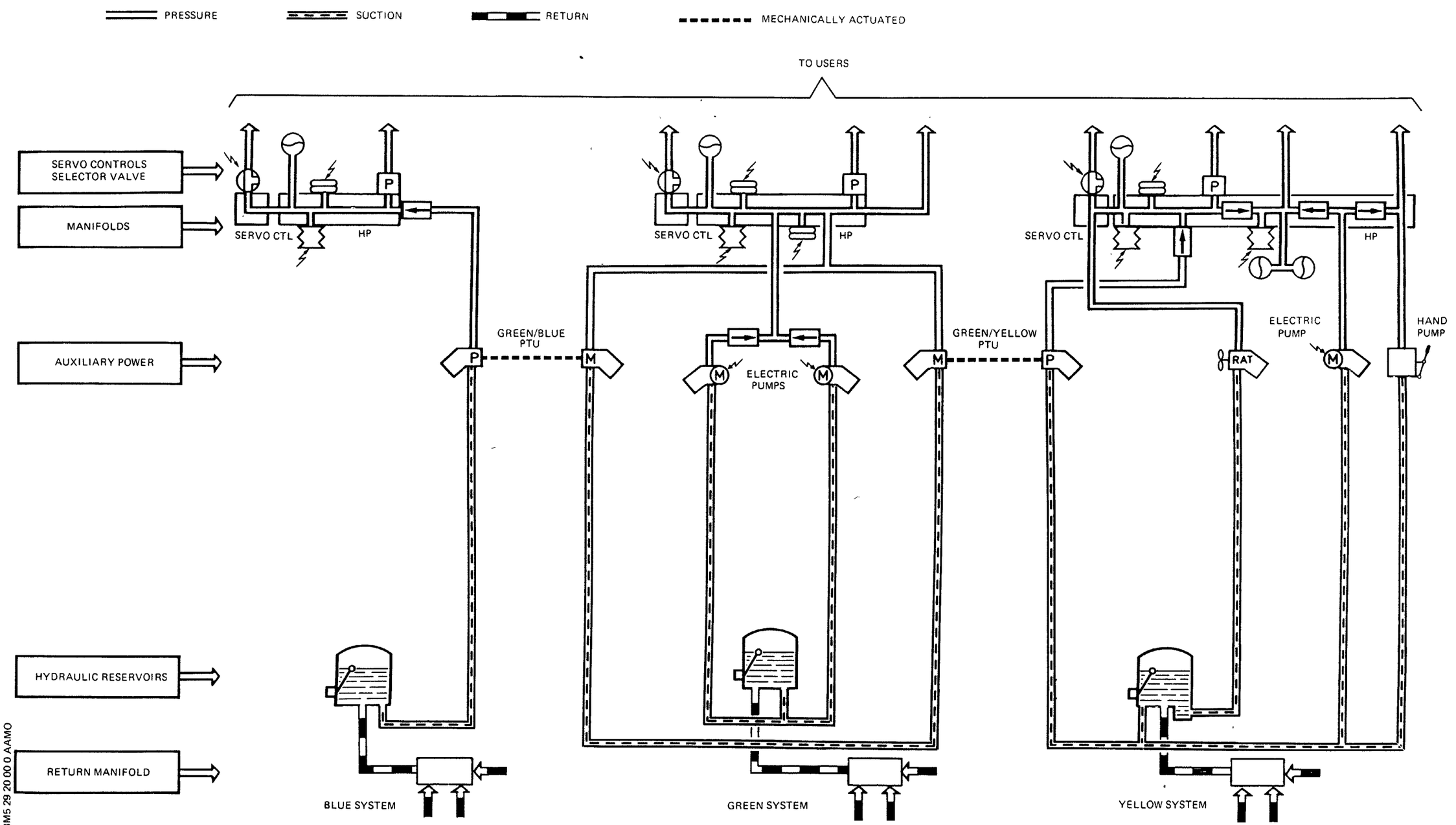
Auxiliary power is provided by :

- Two electric pumps, mounted in parallel, supplying the Green system directly,
- A Green/Blue power transfer unit,
- A Green/Yellow power transfer unit,
- An electric pump in the Yellow system,
- A hand pump in the Yellow system,
- A ram air turbine in the Yellow system.

These auxiliary sources of power are described in the following sections.

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Auxiliary Power
Figure 001

1. Description

Two parallel-mounted electric pumps supply power :

- To the Green system, directly,
- To the Blue and Yellow systems, through Green/Blue and Green/Yellow power transfer units.

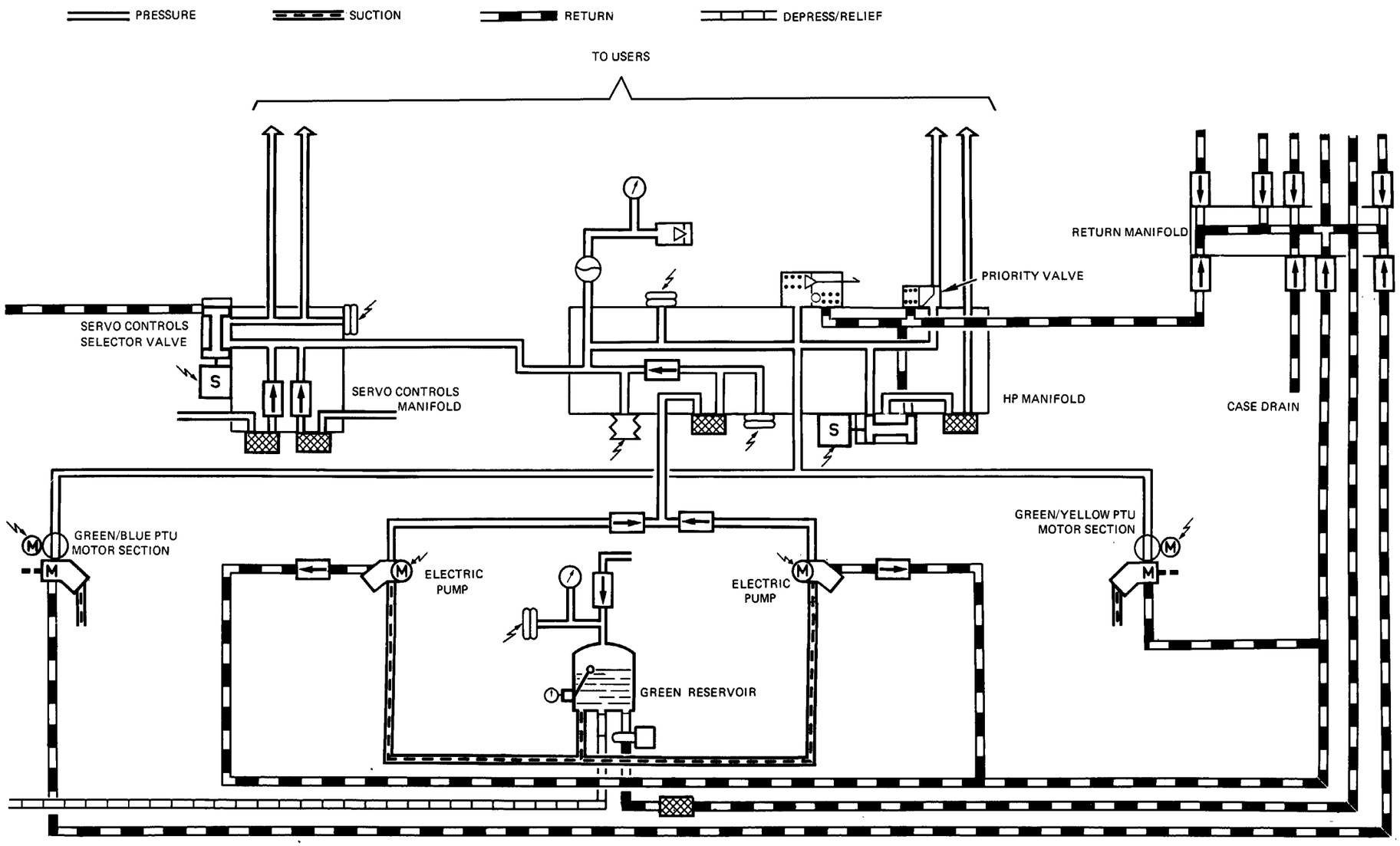
Both electric pumps draw fluid from the Green system reservoir, and are of the soft compensation type. They are used mainly on the ground, for testing or pre-flight check list procedures, but can also be used in flight, at the crew's discretion, to boost fluid flow. However, such cases of utilization are never of a mandatory nature.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)
(Ref. Fig. 003)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
291079	FILTER-G ELEC PUMP DELIVERY		147	734	29-21-17
5GE	DET-PH UNBAL, G ELEC PUMP 1		122	121BL	29-21-17
6GE	DET-PH UNBAL, G ELEC PUMP 2		122	121BL	29-21-17
7GE	CNTOR-G ELEC PUMP 1	107VU	121	121BL	29-21-27
8GE	CNTOR-G ELEC PUMP 2	107VU	121	121BL	29-21-27
9GE	CURRENT TRANSFORMER-G ELEC PUMP 1	107VU	121	121BL	29-21-25
10GE	CURRENT TRANSFORMER-G ELEC PUMP 2	107VU	121	121BL	29-21-25
11GE	ELEC PUMP-GREEN, 1		147	734	29-21-11
12GE	ELEC PUMP-GREEN, 2		147	734	29-21-11
16GE	PRESS SWITCH-G ELEC PUMPS		147	734	29-21-22

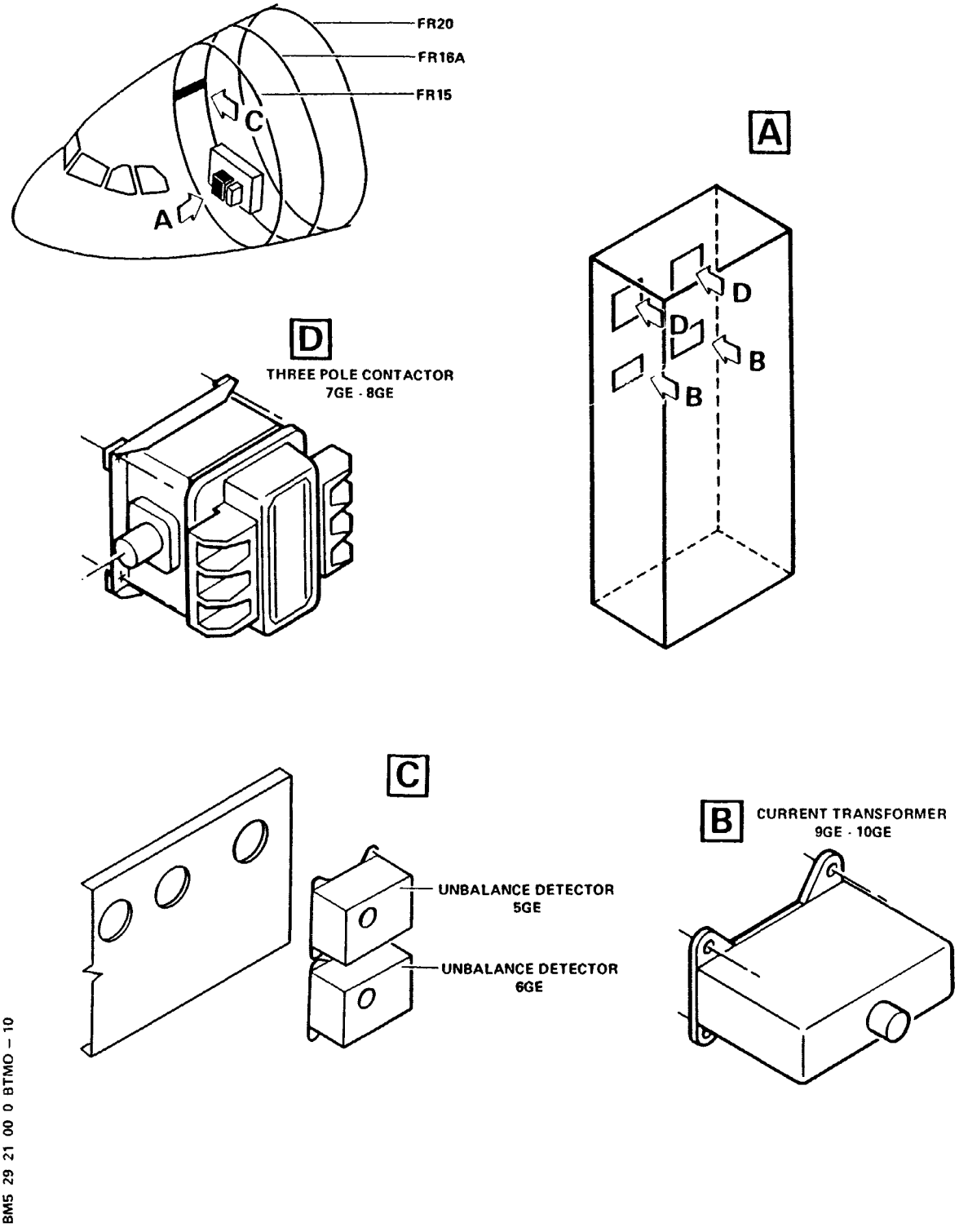
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Green Auxiliary Power System
Figure 001

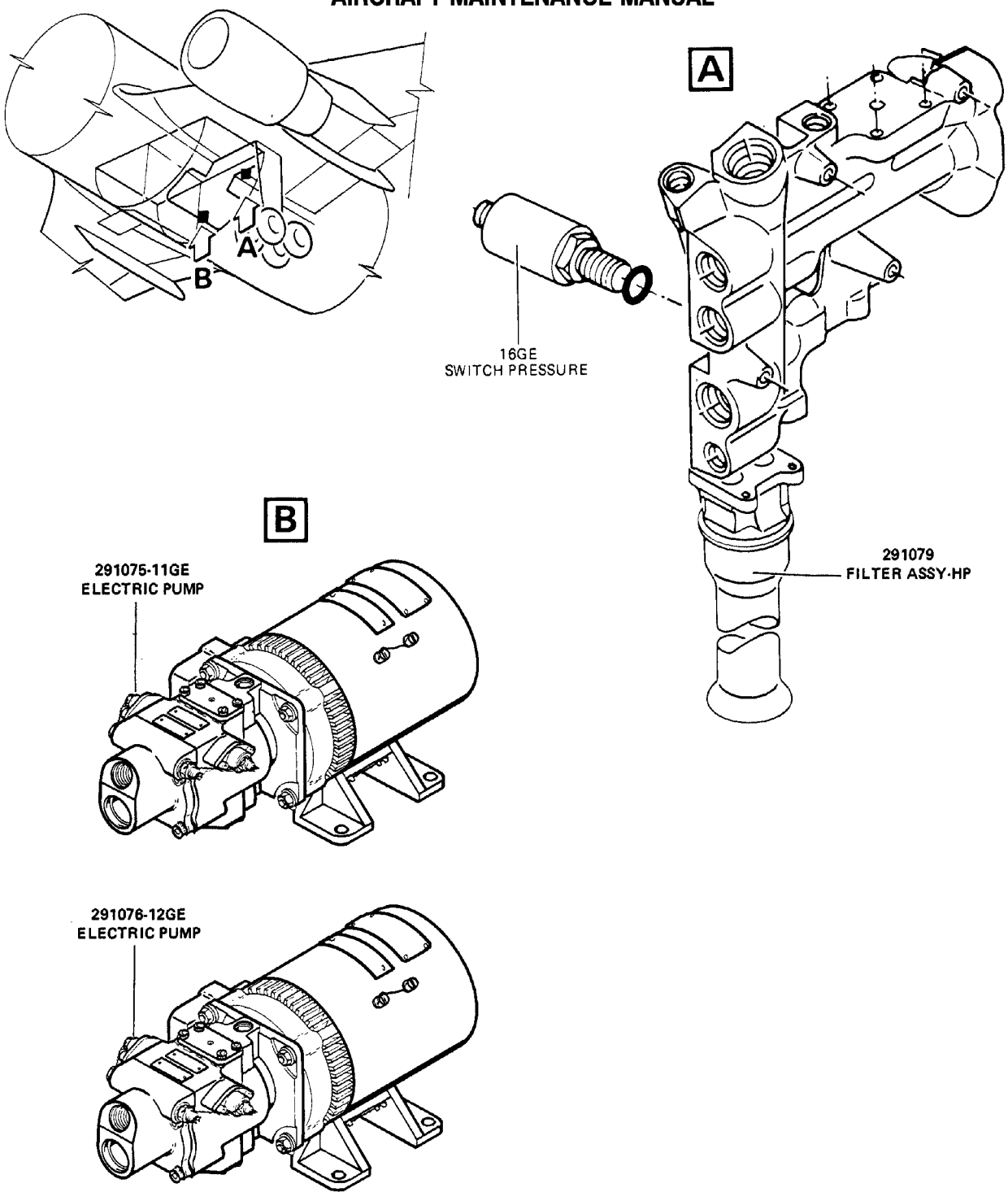
BM5 29 21 00 0 AAM0 02

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Component Location
Figure 002



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Component Location
Figure 003

3. Performance

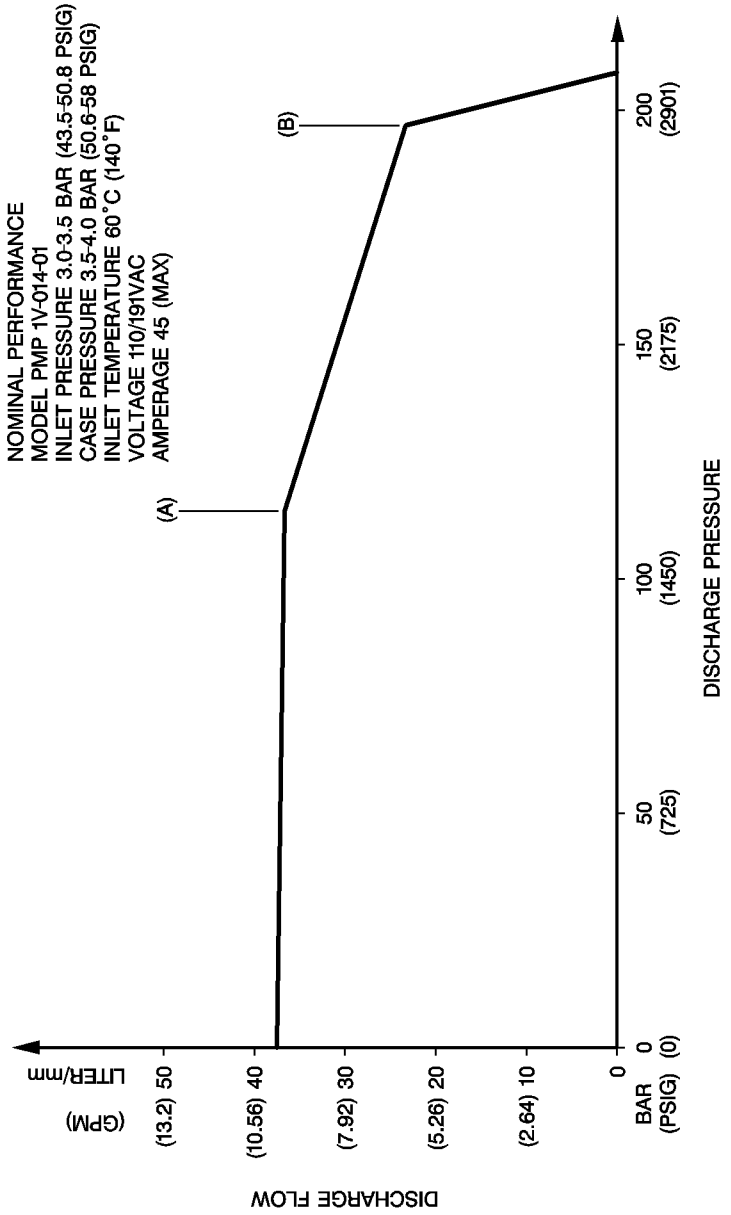
A. Hydraulic Pump

R A pressure compensating mechanism is incorporated, which operates to keep
R the delivery smooth and constant by altering the angle of the inclined
R hanger face in response to system pressure fluctuations. Pressure is
R maintained within a preselected range in response to variations in system
R demand.
R The discharge flow decreases gradually in the three steps as shown in the
R curve of nominal pump-motor performance :
R (Ref. Fig. 004)

- Output pressure at zero delivery : 206 +4 -0 bars
- Output pressure for delivery of 23 l/mn : 195 bars
- Output pressure for delivery of 36 l/mn : 115 bars.
  NOTE : Between 23 and 36 l/mn, outlet pressure varies linearly from 195 bars to 115 bars.
- Suction pressure
  . 1 bar absolute for delivery of 36 l/mn
  . 0.6 bar absolute for delivery of 35 l/mn
  . 0.2 bar absolute for delivery of 0 to 30 l/mn.
- Tolerance on delivery, pressure and electrical values is ± 2%.

B. Electric Motor

- Continuous duty operation on alternating current
- Current : 45 A max. in continuous operation at full load
- The motor is connected to the busbar by a triple conductor cable ; the impedance of each conductor is such that the in-line voltage drop is approximately 5.5 V for the rated load
- Mean nominal voltage of 3 phases at the busbar : 115/200 V
- Mean limit voltage of 3-phases at the busbar : 111 and 119 V
- In normal operation at nominal power, the mean voltage of the three phases at the motor terminals may therefore drop to 105.5 V, taking into account voltage variations due to regulation.
- Rotational speed : approximately 7700 rpm
- Air cooled.



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Nominal Pump - Motor Performance
Figure 004

R

4. Location - Installation
   - Installed in the fuselage center section (hydraulics compartment) at FR54, they are positioned with respect to the Green system reservoir in such a way that there is a constant head of fluid.
   - Installed on a fixed mount by means of rubber shock mounts
   - The delivery, suction and case drain lines are teflon hoses covered with stainless steel braid
   - Removal of either pump is accomplished with negligible loss of fluid owing to a self-sealing coupling at the suction inlet and a check valve at the delivery and case drain oulets.
   - A 3 to 15 micron absolute, 60 l/mn nominal delivery filter is installed on the delivery line common to both pumps. It is mounted on the main HP manifold.
   - A pressure switch on the HP manifold transmits signals when there is pressure in the delivery line common to both pumps.

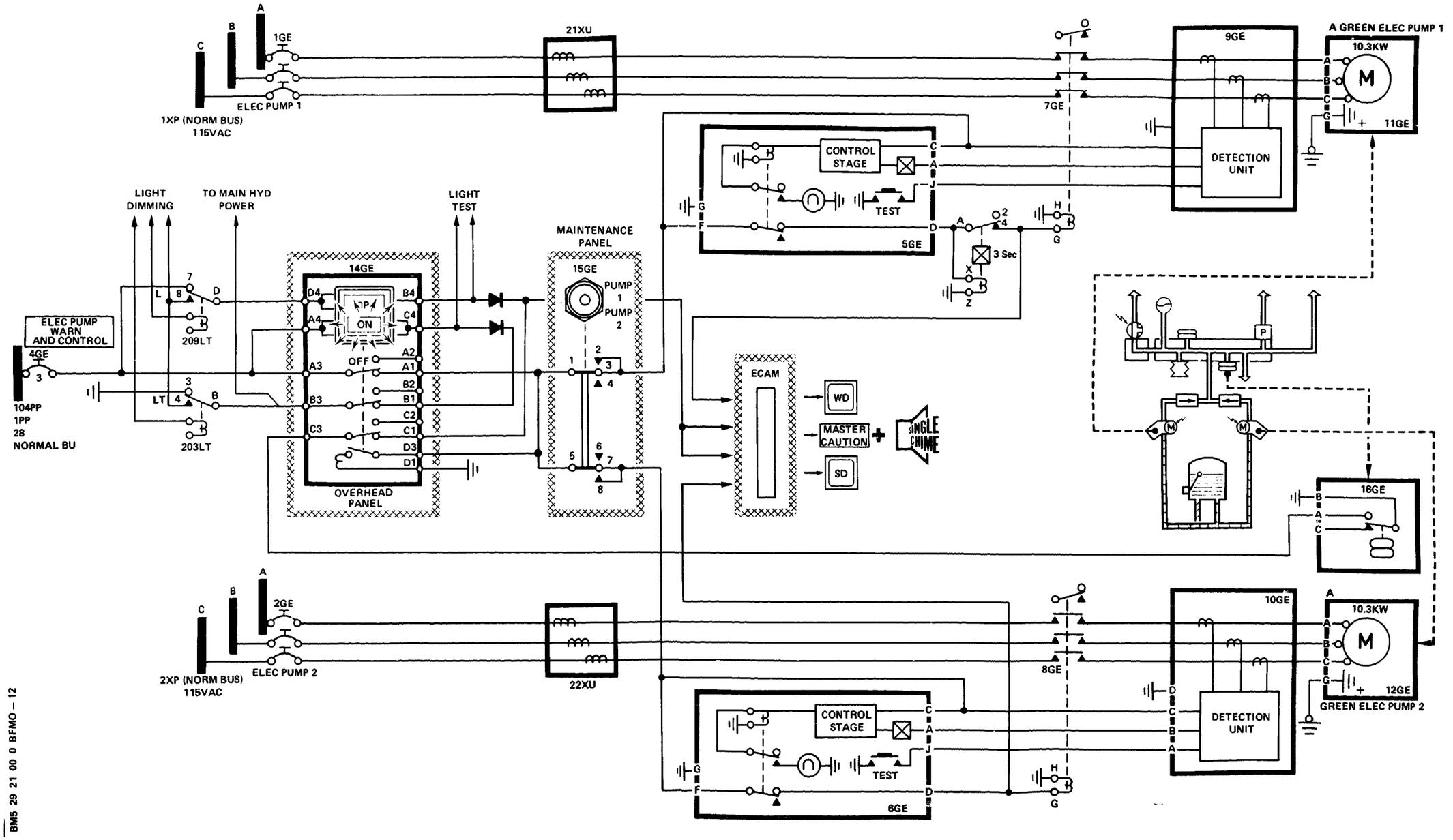
5. Control
   (Ref. Fig. 005)
   (Ref. Fig. 006)

   A. A single ELEC PUMPS pushbutton switch with magnetic locking is provided for the pilots on overhead panel 427VU. When pressed, it activates both electric pumps. A 3-second delay on the electrical power supply to one of the pumps, however, prevents both pumps being supplied simultaneously.

   B. A three-position (PUMP 1 - neutral - PUMP 2) ELEC PUMPS TEST switch on the lateral panel allows power to be supplied to each pump individually for testing purposes.

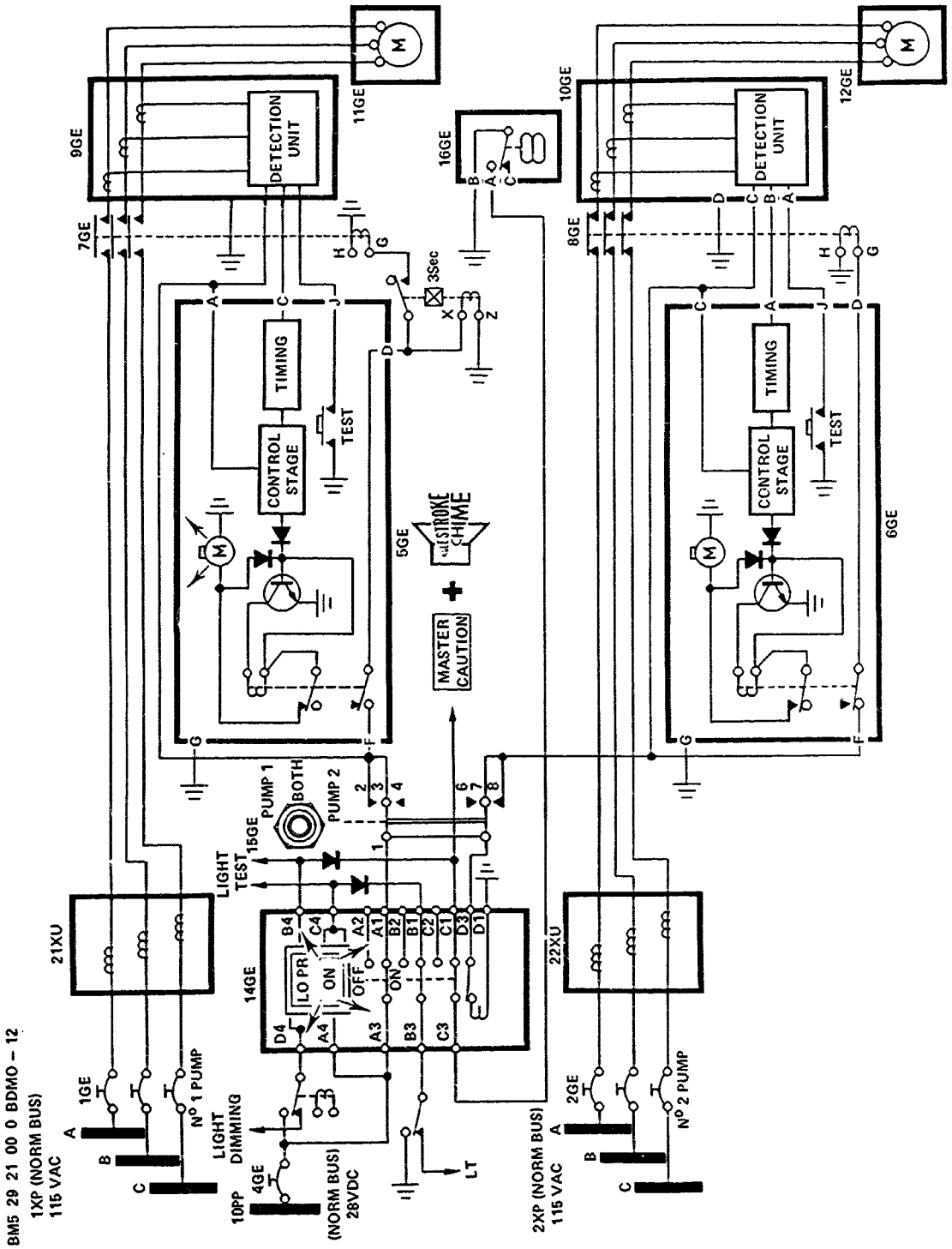
   C. Phase Unbalance Detectors
   The phase unbalance detector (5GE, 6GE) associated to a current transformer (9GE, 10GE) detects, through its delayed action, any current unbalance on the 400Hz AC power line supplying electric pumps (11GE, 12GE).
   Phase unbalance is visualized by a light emitting diode (LED) on the unit.
   If no unbalance condition is present on the line, it is possible to test the detector by pressing a pushbutton switch adjacent to the LED. This action energizes an auxiliary winding of the current transformer magnetic circuit simulating a phase unbalance condition and sends a fault signal to the detector.
   After a time delay has elapsed, this signal energizes a built-in relay which de-energized electric pump control relay 7GE and causes illumination of the LED.
   The warning is memorized, the electric pumps stop until ELEC PUMPS pushbutton switch is actuated again = OFF then ON.

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Green Auxiliary Power - Electric Pumps Control and Monitoring
Figure 005



Phase Unbalance Detector
Figure 006

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROLS, LANDING GEARS ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT THE ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

BEFORE PRESSURIZED HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION BEFORE APPLYING OR RECEIVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT GREEN HYDRAULIC RESERVOIR IS PRESSURIZED IN ORDER TO AVOID CAVITATION OF ELECTRIC PUMPS DURING OPERATION.

1. Reason For The Job
Pressurization of Green Hydraulic System Using Electric Pumps

2. Equipment and Materials

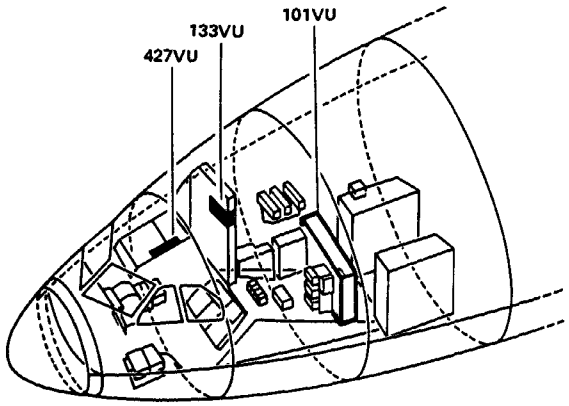
ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 12-12-29, P. Block 1	Hydraulics
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System.

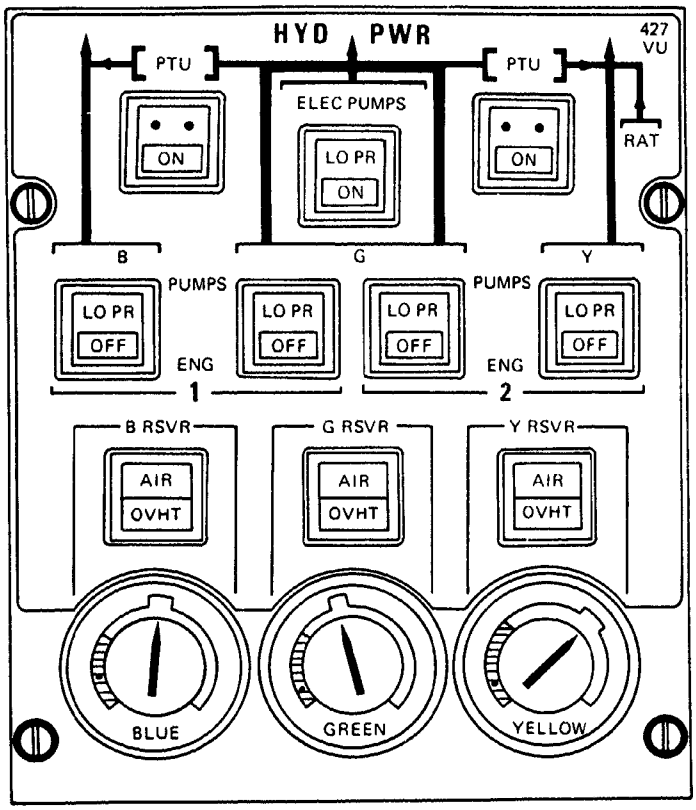
3. Procedure
(Ref. Fig. 301)

A. Job Set-Up
(1)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B08
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RSVR/QTY/IND	1GQ	339/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	ENG/PUMPS/WARN	5GD	332/T57

(2)On center instrument panel 4VU, make certain that landing gear control





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Pressurization Using Green Auxiliary Power
Figure 301

lever is in **DOWN** position. Display a warning notice prohibiting its operation.

(3)Make certain that free fall extension control handle located between first officer and 3rd occupant seats is in normal position and display a warning notice prohibiting its operation.

(4)On **HYD PWR** panel 427VU, make certain that aircraft is in the following configuration :

(a)**PUMPS/ENG1** and **PUMPS/ENG2** pushbutton switches released (out).

(b)**ELEC PUMPS** pushbutton switch released (out)

(c)**Green/Blue PTU** and **Green/Yellow PTU** pushbutton switches released (out)

(5)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics rachs ventilation is correct.

(6)On **HYD PWR** panel 427VU, make certain that :

- **AIR** legend of Green hydraulic reservoir is **OFF**. If not, pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
- **OVHT** legend of Green system is **OFF**.
- Quantity indicator pointer is within the upper small green arc limits. Top up Green hydraulic reservoir if required (Ref. 12-12-29, P. Block 1).

B. Pressurization of Green Auxiliary Hydraulic System.

(1)On **HYD PWR** panel 427VU : press **ELEC PUMPS** pushbutton switch, **ON** legend comes on.

(2)On **ECAM** control panel, press **HYD** pushbutton switch, **HYD** page appears on right **ECAM** display unit. Check that **GREEN** system page reads 3000 psi (206 bars).

C. Close-Up

(1)On **HYD PWR** panel 427VU, release **ELEC PUMPS** pushbutton switch, **ON** legend goes off.

(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS MAKE CERTAIN THAT HYDRAULIC SYSTEMS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED AND SAFETY PRECAUTIONS OBSERVED.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
MAKE CERTAIN THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Operational Test

A. Reason for the Job

To test Green auxiliary power indicating circuits and electric pump operation.

WARNING : MAKE CERTAIN THAT THE GREEN RESERVOIR IS PRESSURIZED TO AVOID ELECTRIC PUMPS CAVITATION DURING THEIR OPERATION.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear, Main Door - (Ground Door(s) Opening)

C. Procedure

(1)Job set-up

(a)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		Line 108
21VU	SDAC and FWC2		Line 109
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RAT/TEST	1GF	331/V59
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/AUTO	153LP	323/M83

R (b)Open one main gear main door (Ref. 32-12-11, P. Block 301).
R (c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (d)Make certain that electronics racks ventilation is correct.
R (e)Check that Green reservoir 291000 quantity indication is correct.
R (f)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
R (g)In flight compartment, make certain that the aircraft is in the following configuration :

1 On HYD PWR panel 427VU
PTU pushbutton switches released (out), ON legends off.
PUMPS ENG 1 and 2 pushbutton switches released (out), OFF legends on.
ELEC PUMPS pushbutton switch released (out), ON and LO PR legends off.
Green reservoir hydraulic quantity indicator (2GQ) pointer in green segment.
Annunciator AIR, OVHT legends off.
2 On ECAM control panel, press HYD pushbutton switch.
- On right ECAM display unit, HYD page appears. Check that GREEN hydraulic system pressure is approximately zero.

(2)Test of annunciator lights

ACTION	RESULT
1. On panel 436VU, place ANN LT switch in TEST position.	On panel 427VU, - PTU pushbutton switches ON legends come on. - ELEC PUMPS pushbutton switch LO PR and ON legends come on. - The four PUMPS ENG 1 and 2 push-button switches LO PR and OFF legends come on. - Annunciator AIR and OVHT legends come on.

ACTION	RESULT
2. On panel 436VU, place ANN LT switch in BRT position.	On panel 427VU, - Annunciators return to initial configuration.

(3)Test of ELEC PUMPS pushbutton switch

ACTION	RESULT
1. On panel 427VU, press ELEC PUMPS pushbutton switch.	In hydraulics compartment - make certain that both electric pumps operate.
2. De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).	In hydraulics compartment - both electric pumps stop.
3. Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct	In hydraulics compartment - make certain that both electric pumps remain stopped. In flight compartment, on panel 427VU. - ON and LO PR legends are off.

NOTE : When checking ELEC PUMPS pushbutton switch, never use circuit breakers to cut off electric pumps power supply.

(4)Test of electric pumps

ACTION	RESULT
1. On panel 428VU, release SERVO CTL/G pushbutton switch.	On panel 428VU, OFF legend and LO PR legend come on.
2. On panel 427VU, press (in) ELEC PUMPS pushbutton switch.	In hydraulics compartment : Electric pump 2 (12GE) starts up. Three seconds later, electric pump 1 (11GE) starts up. On panel 427VU, - ON and LO PR legends come on. On right ECAM display unit, - Electric pump box display indicates LO (amber display) and liaison line comes on (amber display). - Pressure read on indicator increases. When pressure reaches approx. 1750 psi (120 bars), on panel 427VU, on ELEC PUMPS pushbutton switch, LO PR legend goes off and ON legend remains on. On right ECAM display unit, - Electric pump box display is "in line" (green display) and liaison line comes on green. - Pressure increases to 3000 ± 150 psi (206 ± 10 bars).
3. On maintenance panel 471VU, place ELEC PUMP TEST switch in PUMP 2 position and maintain it.	In hydraulic compartment : - Electric pump 1 (11GE) is deactivated. - Electric pump 2 (12GE) remains energized. In flight compartment : On right ECAM display unit, - Make certain that pressure remains at 3000 ± 150 psi (206 ± 10 bars).
4. On maintenance panel 471VU, release ELEC PUMP TEST switch (switch is spring loaded to NEUTRAL position)	In hydraulics compartment : - Electric pump 1 (11GE) restarts. - Electric pump 2 (12GE) remains energized. In flight compartment : On right ECAM display unit, pressure remains at 3000 ± 150 psi (206 ± 10 bars).
5. On panel 428VU, press SERVO	On panel 428VU, OFF legend and LO PR

	ACTION	RESULT
	CTL/G pushbutton switch.	legend go off.
	6. In zone 122 on phase unbalance detector (5GE)	After 3 to 10 seconds. On phase unbalance detector (5GE),
R	Press PTT pushbutton switch.	test light comes on.
R	Release PTT pushbutton switch.	In hydraulics compartment : Electric pump 1 (11GE) stops.
	7. On maintenance panel 471VU, place ELEC PUMPS TEST switch in PUMP 2 position, then release	- In zone 122, on phase unbalance detector (5GE) test light goes off. - in hydraulics compartment electric, pump1 (11GE) starts.
	8. On maintenance panel 471VU, place ELEC PUMP TEST switch in PUMP 1 position and maintain it.	In hydraulics compartment : - Electric pump 2 (12GE) is deactivated. - Electric pump 1 (11GE) remains energized. In flight compartment : On right ECAM display unit, - Make certain that pressure remains at 3000 ± 150 psi (206 ± 10 bars).
	9. On maintenance panel 471VU, release ELEC PUMP TEST switch (switch is spring loaded to NEUTRAL position)	In hydraulics compartment : - Electric pump 2 (12GE) restarts. - Electric pump 1 (11GE) remains energized. In flight compartment : On right ECAM display unit, pressure remains at 3000 ± 150 psi (206 ± 10 bars).
	10. In zone 122 on phase unbalance detector (6GE)	After 3 to 10 seconds. On phase unbalance detector (6GE),
R	Press PTT pushbutton switch.	test light comes on.
R	Release PTT pushbutton switch.	In hydraulics compartment : Electric pump 2 (12GE) stops.
	11. On maintenance panel 471VU, place ELEC PUMPS TEST switch in PUMP 1 position, then release.	- In zone 122, on phase unbalance detector (6GE), test light goes off. - In hydraulics compartment electric
R		pump 2 (12GE) starts.
	12. On panel 427VU, release (out) ELEC PUMPS pushbutton switch.	On panel 427VU, ELEC PUMPS pushbutton switch, ON legend goes off. On right ECAM display unit, the

ACTION	RESULT
	electric pump box display is cross-line and comes on (green).

(5)Close-up
(a)In flight compartment, make certain that the aircraft is in the following configuration :
1 On **HYD PWR** panel 427VU :
PUMPS ENG1 and 2 pushbutton switches pressed (in), **OFF** legend off.
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Remove access platform.
(d)Close main gear door (Ref. 32-12-11, P. Block 301).

R 2. Functional Test

R A. Reason for the Job
R To test Green auxiliary power indicating circuits and electric pump
R operation (Ref. Operational test Para. 1.).

ELECTRIC PUMP - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A. 97A29102035000	Connector-Pressurizing, Hydraulic Tank
B. 97A29102062000	Connector-Depressurizing, Hydraulic Tank
C.	Blanking Plugs/Caps
D.	Warning Notices
E. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
F.	Access Platform 2.6 m (8ft. 8 in.)
G.	Fluid Recovery Containers.
Referenced Procedures	
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Doors(s) Opening)
- 24-41-00, P. Block 301	AC External Power Control
- 12-12-29, P. Block 1	Hydraulic Reservoir Replenishing
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

2. Procedure

A. Job Set-Up
(1)Depressurize Green hydraulic system. (Ref. 29-10-00, P. Block 301).
(2)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(3)In flight compartment, on panel 427VU :
(a)Make certain that Green system electric pumps are shut down (ON legend of ELEC PUMPS pushbutton switch off).
(b)Display a warning notice on control panel prohibiting operation of Green pumps.
(4)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(5)Open main landing gear left door.
(6)Position access platform in zone 147.

B. Removal
CAUTION : CHECK THE HYDRAULIC SYSTEM FILTERS IF THE PUMP HAS BEEN REMOVED BECAUSE OF OPERATION WITHOUT FLUID, OR BECAUSE OF MALFUNCTIONING AND HENCE POSSIBLE INTERNAL DAMAGE. IF FOREIGN MATTER IS FOUND ON THE FILTERS, THE LINES CONNECTING THE PUMP TO THE FILTERS MUST BE FLUSHED. SUPPORT THE PUMP DURING REMOVAL AND INSTALLATION OPERATIONS. APPROXIMATE WEIGHT : 12.7 kg (28 lb.) AFTER REMOVAL CHECK THAT THE SHOCKMOUTS AND THE SHOCKMOUTS AND THE PUMP ATTACHMENT FITTINGS ARE NOT DAMAGED. IF ONE PART IS DAMAGED. SUBSTITUTE A NEW COMPLETE SET FOR USED ONE.

R **ON A/C 101-200,

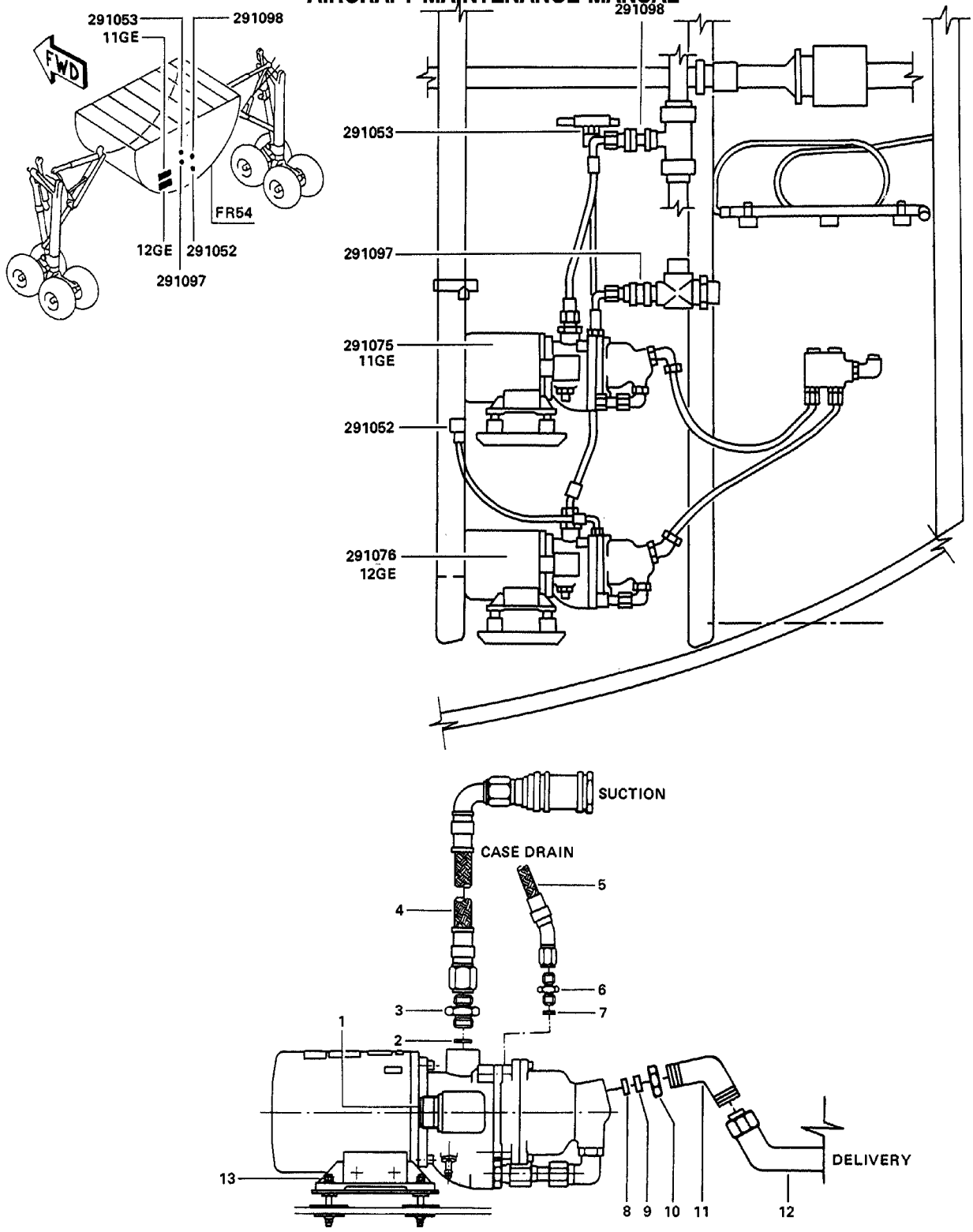
(Ref. Fig. 401)

R **ON A/C 001-100,

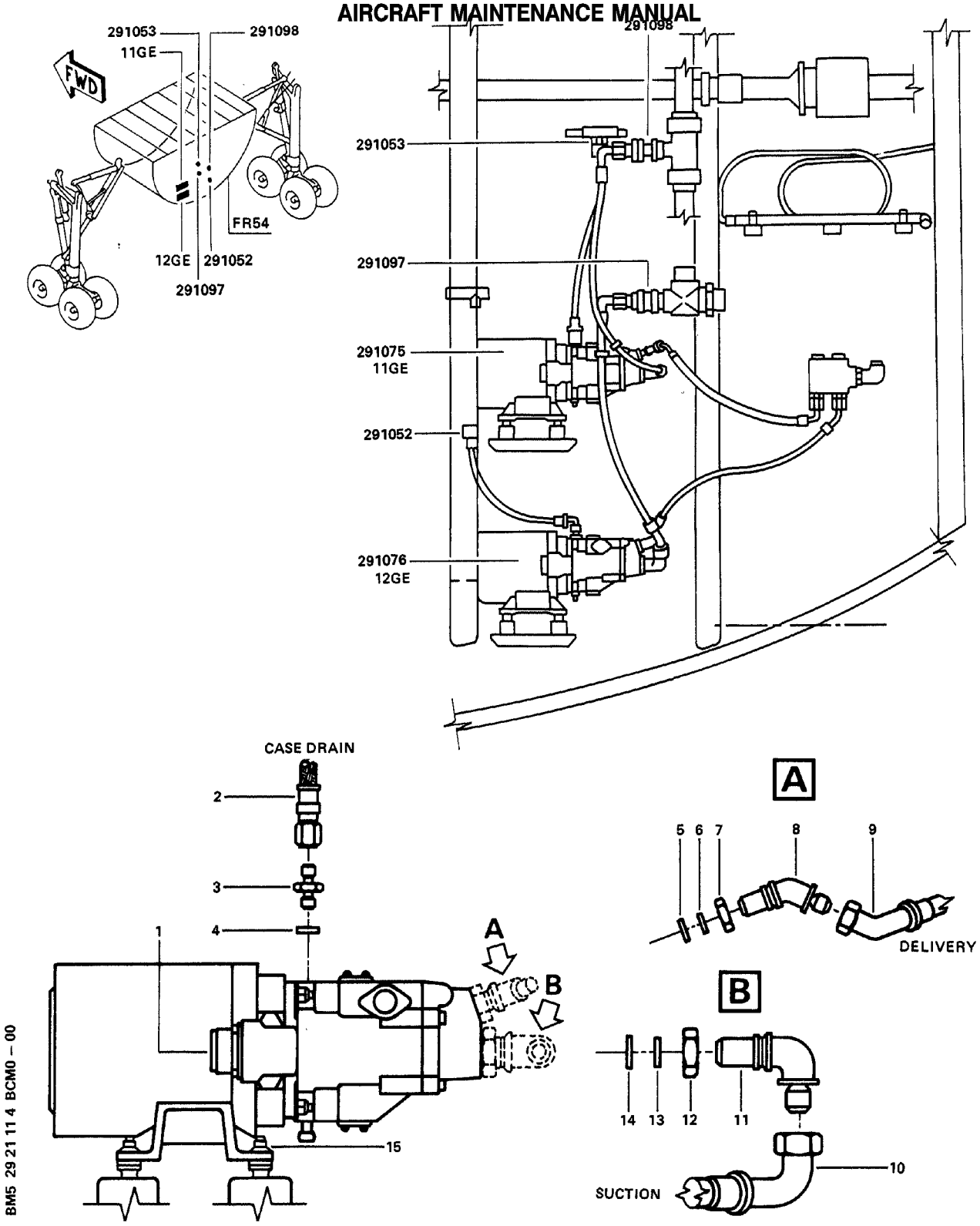
(Ref. Fig. 402)

R **ON A/C 101-200,

NOTE : As both electric pumps are identical, only removal/Installation of pump 11GE is described
(1)Disconnect electrical plug (1)
(2)Position a fluid recovery container or absorbant material under self sealing couplings 1098 (1097).
(3)Position a fluid recovery container or absorbant material under pump body.
(4)Disconnect self sealing couplings 291098 (291097).



Electric Pump 11GE (12GE)
Figure 401



Electric Pump 11GE (12GE)
Figure 402

(5)Disconnect delivery line (12) from elbow (11).
(6)Disconnect case drain line at check valve 291053 (291052).
(7)Unscrew and remove the four attaching nuts (13).
(8)Remove pump from mount.

C. Preparation of Replacement Component
(1)Remove the following items from removed electric pump :
(a)Disconnect suction line (4) from reducer (3).
(b)Remove reducer (3). Discard seal (2).
(c)Disconnect case drain line (5) from reducer (6).
(d)Remove reducer (6). Discard seal (7).
(e)Remove elbow (11) and nut (10). Discard back up seal (9) and seal (8).
(2)Install the following on replacement electric pump :
(a)Install reducer (3) with new seal (2).
(b)Install reducer (6) with new seal (7).
(c)Install elbow (11) and nut (10) with new seal (8) and back up seal (9).
(d)Connect suction line (4) on reducer (3). Hand tighten.
(e)Connect case drain line (5) on reducer (6). Hand tighten.

D. Installation
(1)Install electric pump assembly on mount.
(2)Install and tighten the four attaching nuts (13).
(3)Install delivery line (12) on elbow (11) and tighten. Tighten nut (10).
(4)Position fluid recovery container at open end of case drain line (5) for bleeding of pump.
(5)Connect at self sealing couplings 291098 (291097). Tighten suction line (4) at reducer (3).
(6)Tighten case drain line (5) at reducer (6).
(7)Bleed electric pump using case drain line :
(a)Pressurize Green Hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(b)Check that fluid flow is free of air bubbles.
(c)Connect case drain line (5) to check valve 291053 (291052).
R (8)Perform following steps to make certain that there is no air in hydraulic
R system :
R (a)Make certain that air pressure in Green hydraulic reservoir is not
R less than 3.5 bars (50 psi). If necessary, pressurize reservoir
R (Ref. 29-14-00, P. Block 301).
R (b)On Green reservoir hydraulic quantity transmitter, record position of
R fluid level pointer.
R (c)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
R (d)On Green hydraulic quantity transmitter, record movement of fluid
R level pointer.
R NOTE : Movement of pointer shows an increase of fluid level in
R reservoir because of air expansion in system.
R (e)If movement of pointer between pressurized and depressurized conditions
R is more than :
R - 2 liters for Green system
R repeat bleeding procedure until result is satisfactory.
(9)Connect electrical connector (1).

R **ON A/C 001-100,

NOTE : As both electric pumps are identical, only removal/Installation of pump 11GE is described.

(1)Disconnect electrical plug (1).
(2)Position a fluid recovery container or absorbant material under self sealing coupling 291098 (291097).
(3)Position a fluid recovery container or absorbant material under pump body.
(4)Disconnect self sealing coupling 291098 (291097).
(5)Disconnect delivery line (9) from elbow (8).
(6)Disconnect case drain line (2) at check valve 291053 (291052).
(7)Unscrew and remove the four attaching nuts (15).
(8)Remove pump from mount.

C. Preparation of Replacement Component
(1)Remove the following items from removed electric pump :
(a)Disconnect suction line (10) from elbow (11).
(b)Remove elbow (11) and nut (12). Discard back up seal (13) and seal (14).
(c)Disconnect case drain line (2) from reducer (3).
(d)Remove reducer (3). Discard seal (4).
(e)Remove elbow (8) and nut (7). Discard back up seal (6) and seal (5).
(2)Install the following on replacement electric pump :
(a)Install elbow (11) and nut (12) with new seal (14) and back up seal (13).
(b)Install reducer (3) with new seal (4). Tighten reducer (3).
(c)Install elbow (8) and nut (7) with new seal (5) and backup seal (6).
(d)Connect suction line (10) on elbow (11).
(e)Connect case drain line (2) on reducer (3). Hand tighten.

D. Installation
(1)Install electric pump assembly on mount.
(2)Install and tighten the four attaching nuts (15).
(3)Install delivery line (9) on elbow (8) and tighten.
(4)Position fluid recovery container at open end of case drain line (2) for bleeding of pump.
(5)Connect at self sealing coupling 291098 (291097). Tighten suction line (10) at elbow (11).
(6)Tighten case drain line (2) at reducer (3).
(7)Tighten nut (7) and (12).
(8)Bleed electric pump using case drain line :
(a)Pressurize Green Hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(b)Check that fluid flow is free of air bubbles.
(c)Connect case drain line (2) to check valve 291053 (291052).
(9)Perform following steps to make certain that there is no air in hydraulic system :
(a)Make certain that air pressure in related hydraulic reservoir is not less than 3.5 bars (50 psi). If necessary, pressurize reservoir (Ref. 29-14-00, P. Block 301).

(b)On related reservoir hydraulic quantity transmitter, record position of fluid level pointer.
(c)Depressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(d)On related hydraulic quantity transmitter, record movement of fluid level pointer.
NOTE : Movement of pointer shows an increase of fluid level in reservoir because of air expansion in system.
(e)If movement of pointer between pressurized and depressurized conditions is more than :
- 2 liters for Green system
- 1.5 liters for Blue system
- 1.5 liters for Yellow system
repeat bleeding procedure until result is satisfactory.
(10)Connect electrical connector (1).

R **ON A/C ALL

E. Test
(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.
(3)In flight compartment, remove warning notices :
(a)On ECAM control panel press HYD pushbutton switch.
(b)On panel 427VU, press ELEC PUMPS pushbutton switch (ON legend on).
(c)On right ECAM display unit, Green pressure rises towards 3000 psi. (206 bars).
(d)On HYD PWR section of panel 471VU, place and hold ELEC PUMPS TEST switch in PUMP 1 (PUMP 2) position to test replaced pump.
(e)On right ECAM display unit, Green pressure stays around 3000 psi. (206 bars).
(f)On HYD PWR section of panel 471VU, release ELEC PUMPS TEST switch.
(g)In zone 147, check for absence of leaks from connections of replaced pump : at self sealing coupling 291097 (291098) and at check valve 291052 (291053).
(h)On panel 427VU, release ELEC PUMPS pushbutton switch (ON legend off).

F. Close-Up
(1)Top-Up Green RSVR if required (Ref. 12-12-29, P. Block 1).
(2)Remove fluid recovery containers and absorbant. Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove access platform and warning notices.
(4)Close main gear door (Ref. 32-12-11, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

ELECTRIC PUMP DELIVERY FILTER 291079 - SERVICING

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Reason for the Job

A. Replacement of Filter Element

2. Equipment and Materials

ITEM	DESIGNATION
A.	Compressed Air Source
B.	Access Platform, 2.60 m (8 ft. 8 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

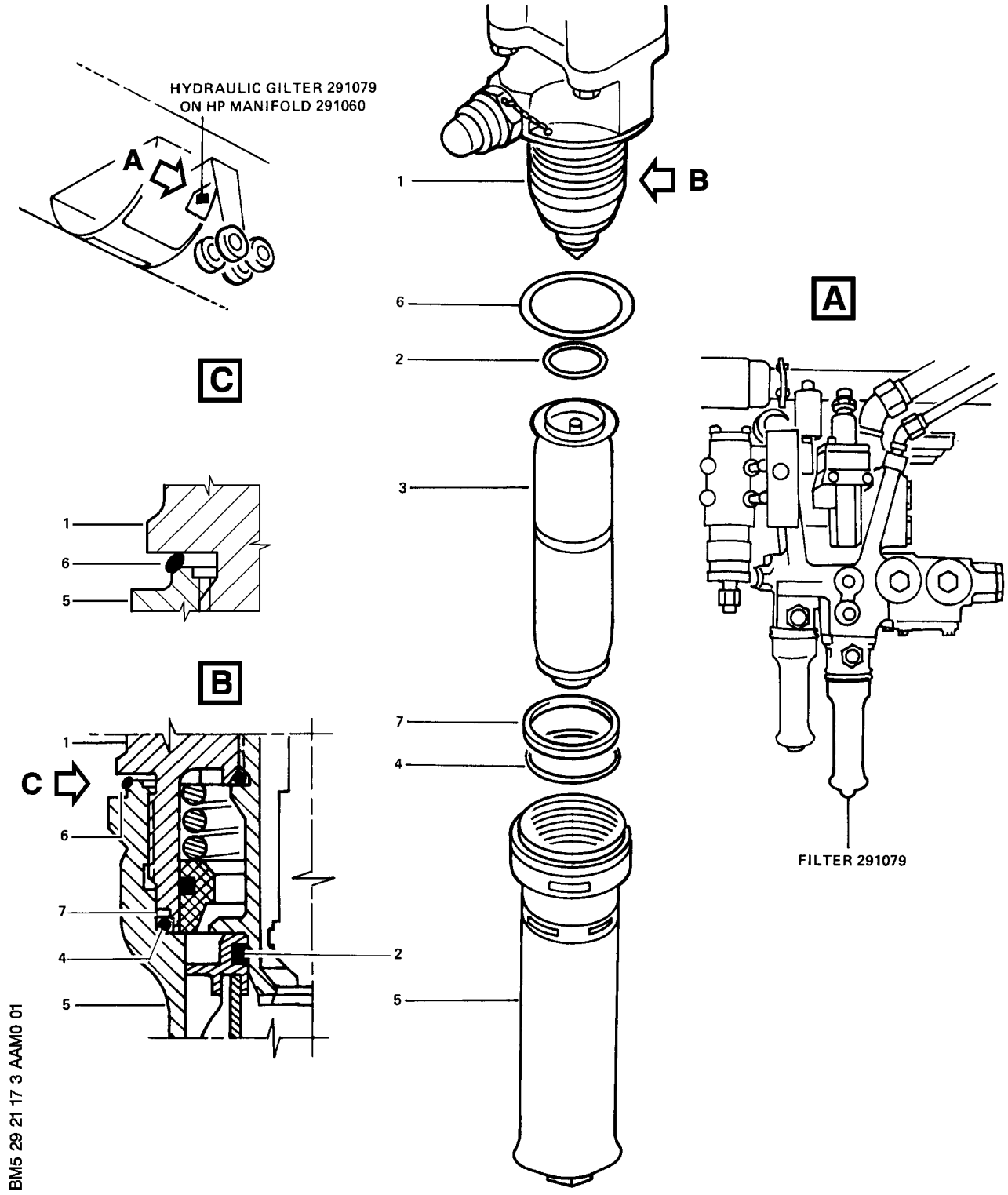
3. Procedure

R A. Job Set-Up
R (1)In flight compartment, on panel 427VU, make certain that the Green
R hydraulic system is in the following configuration :
R (a)ELEC PUMPS pushbutton switch released (out).
R (b)PUMPS ENG 1 and 2 pushbutton switches released (out).
R (2)Display a warning notice on panel 427VU prohibiting pressurization of the
R Green hydraulic system.
R (3)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN 1/B8
133VU	ELEC/PUMPS/WARN	4GE	331/V60
101VU	HYD/PUMP	2GE	GEN 2/B11

(Ref. Fig. 301)

(4)Open left main gear main door (Ref. 32-12-11, P. Block 301).
(5)Install access platform under left main gear.
(6)Depressurize Green system reservoir (Ref. 29-14-00, P. Block 301).
(7)Depressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).



Filter Element Replacement
Figure 301

R

B. Removal

(1)Cut and remove lockwire between filter head (1) and bowl (5).
(2)Unscrew bowl (5).
R (3)Discard O-ring (6).
(4)Discard O-ring (4) and remove back-up ring (7).
(5)Remove filter element (3) from bowl (5). Discard O-ring (2).
NOTE : If filter element (3) is re-usable and if it cannot be cleaned immediately after removal, immerse it in hydraulic fluid after having blanked its outlet port.
Make certain that back-up ring (7) is in correct condition.

C. Installation

CAUTION : INSTALL NEW OR RECONDITIONED FILTER ELEMENT.
FOR A RE-USABLE FILTER ELEMENT, CLEANING MUST BE PERFORMED IN AN ULTRASONIC TANK AND BE FOLLOWED BY A PERFORMANCE TEST. BEFORE INSTALLATION, NEW O-RINGS MUST BE COATED WITH HYDRAULIC FLUID.

(1)Install new O-ring (4) and back-up ring (7) on bowl (5).
(2)Install new O-ring (2) on filter element (3)
(3)Install filter element (3) in bowl (5), previously cleaned then dried off with clean and dry compressed air.
R (4)Position bowl/filter element assembly under filter head (1).
R (5)Install new O-ring (6) on bowl (5).
(6)Tighten bowl (5) home. MAXIMUM TORQUE : 4 m.daN (30 lbf.ft.).
(7)Wirelock bowl (5).
(8)Press clogging indicator if protruding.

D. Test

(1)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(2)Remove safety clips and tags and close circuit breakers 1GE, 2GE and 4GE.
(3)Energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.
(4)Pressurize Green hydraulic system using Green electric pumps (Ref. 29-21-00, P. Block 301).
(5)Check filter for leakage.

E. Close-Up

(1)Check fluid level of Green reservoir and top up if required (Ref. 12-12-29, P. Block 1).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove all ground handling and maintenance equipment, standard and special tools together with replenishing equipment, all access equipment and miscellaneous items.
(4)Close left main gear main door (Ref. 32-12-11, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

ELECTRIC PUMP CONTACTOR 7GE (8GE) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Torque Wrench
C.	Circuit Breaker Safety Clips
Referenced Procedures	
- 24-23-00, P. Block 301	Auxiliary AC Generation
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(2)Make sure that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.

NOTE : This is to avoid 115 Volt on contactors which are upstream EXT PWR line contactor.

(3)Open access door 121BL.

(4)In flight compartment, on ELEC PWR panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting operation of BAT1, 2, 3, APU GEN and BAT OVRD pushbutton switches.

(5)In flight compartment, on APU section of ENG START panel 429VU, install warning notice prohibiting operation of APU.

(6)In avionics compartment, remove front panel from relay box 107VU.

B. Removal

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MARK ALL ELECTRICAL CONNECTIONS FOR RELOCATION PURPOSES.

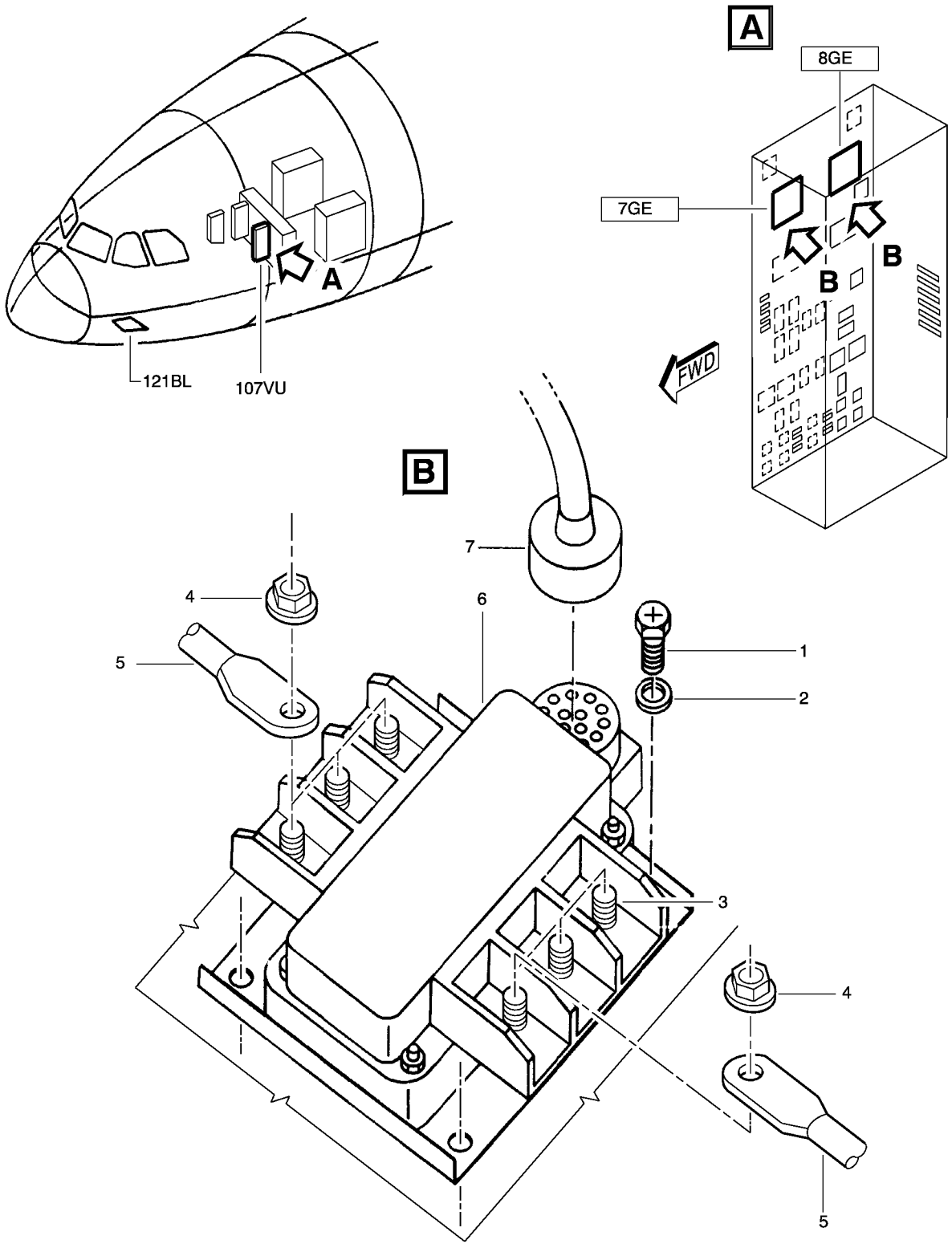
NOTE : Removal procedure is identical for line contactors 7GE and 8GE.

(1)Disconnect connector (7).

(2)Remove nuts (4) and remove power connections (5).

(3)Remove screws (1) and washers (2).

(4)Remove contactor (6).



BM5 29 21 27 4 AEM0 00

Electric Pump Contactor
Figure 401

R

C. Installation

R CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.
R NOTE : Installation procedure is identical for line contactors 7GE and 8GE.
R (1)Position contactor (6) , tighten with the four screws (1) and
R washers (2).
R (2)Secure power connections (5) with nuts (4).
R (3)TORQUE nuts (4) to between 0.25 and 0.30 m.daN (22.12 and 26.55 lbf.in.).
R (4)Connect connector (7).
R (5)Remove safety clips and tags and close circuit breakers 1GE, 2GE and 4GE.

R D. Test
R (1)Make sure the aircraft electrical network is correctly supplied by
R external power (Ref. 24-41-00, P. Block 301) or by APU generator
R (Ref. 24-23-00, P. Block 301).

R E. Close-Up
R (1)Install front panel on relay box 107VU.
R (2)Close access door 121BL.
R (3)Remove warning notices.

BLUE AUXILIARY POWER - DESCRIPTION AND OPERATION

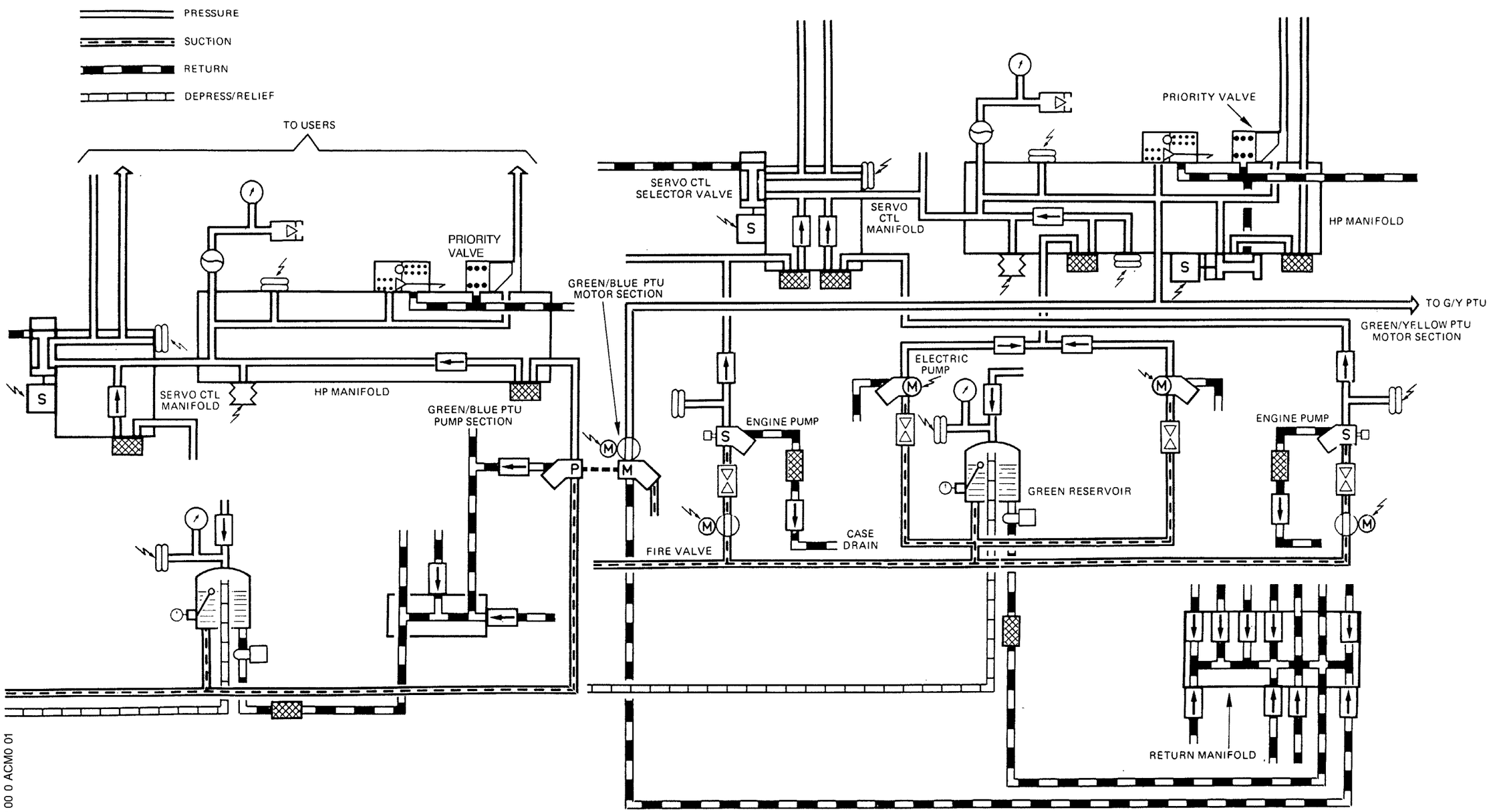
1. Description
(Ref. Fig. 002, 001)

The Green/Blue power transfer unit is composed of a hydraulic motor driving a hydraulic pump by means of a mechanical liaison (shaft).
The motor operates of fluid supplied from the Green system ; the pump pressurizes the Blue system, and draws its fluid from the Blue system reservoir. This system allows transfer of power, whilst maintaining independence of the fluid sources. A solenoid or motor-controlled flow shut off valve integral with the motor enables activation or deactivation of the transfer unit.The transfer unit is used mainly on the ground to pressurize the Blue systemby means of the Green system, which is itself pressurized by the Greensystem electric pumps or by a ground power cart.
It may also be used in flight to compensate for failure of the Blue system engine pump.
Transfer unit operation initiated by commanding opening of the motor section solenoid-controlled flow shut off valve.
To prevent transfer unit overspeed occurring in the event of a Blue system pressure line rupture, the motor section includes a flow limiter.

2. Component Location
(Ref. Fig. 003)

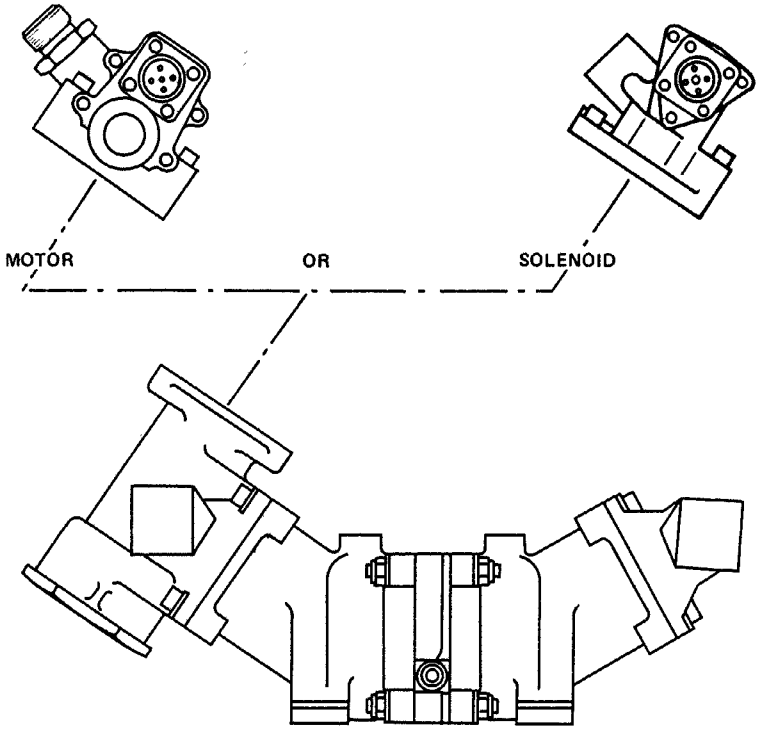
	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
R	2091	FILTER-G/B PTU DELIVERY		571	571BB	29-22-13
R	5GL	POWER TRANSFER UNIT-G/B		571	571BB	29-22-11

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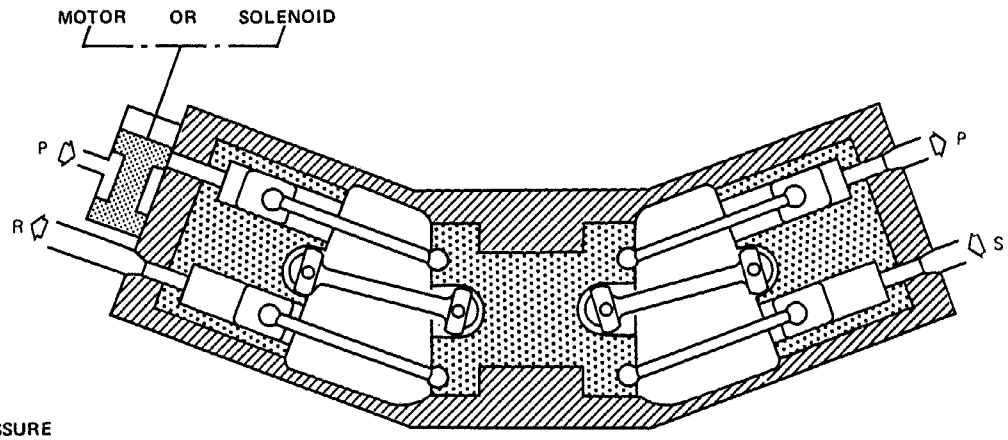


BM5 29 22 00 0 ACM0 01

R Blue Auxiliary Power System (Power Transfer Unit)
Figure 001



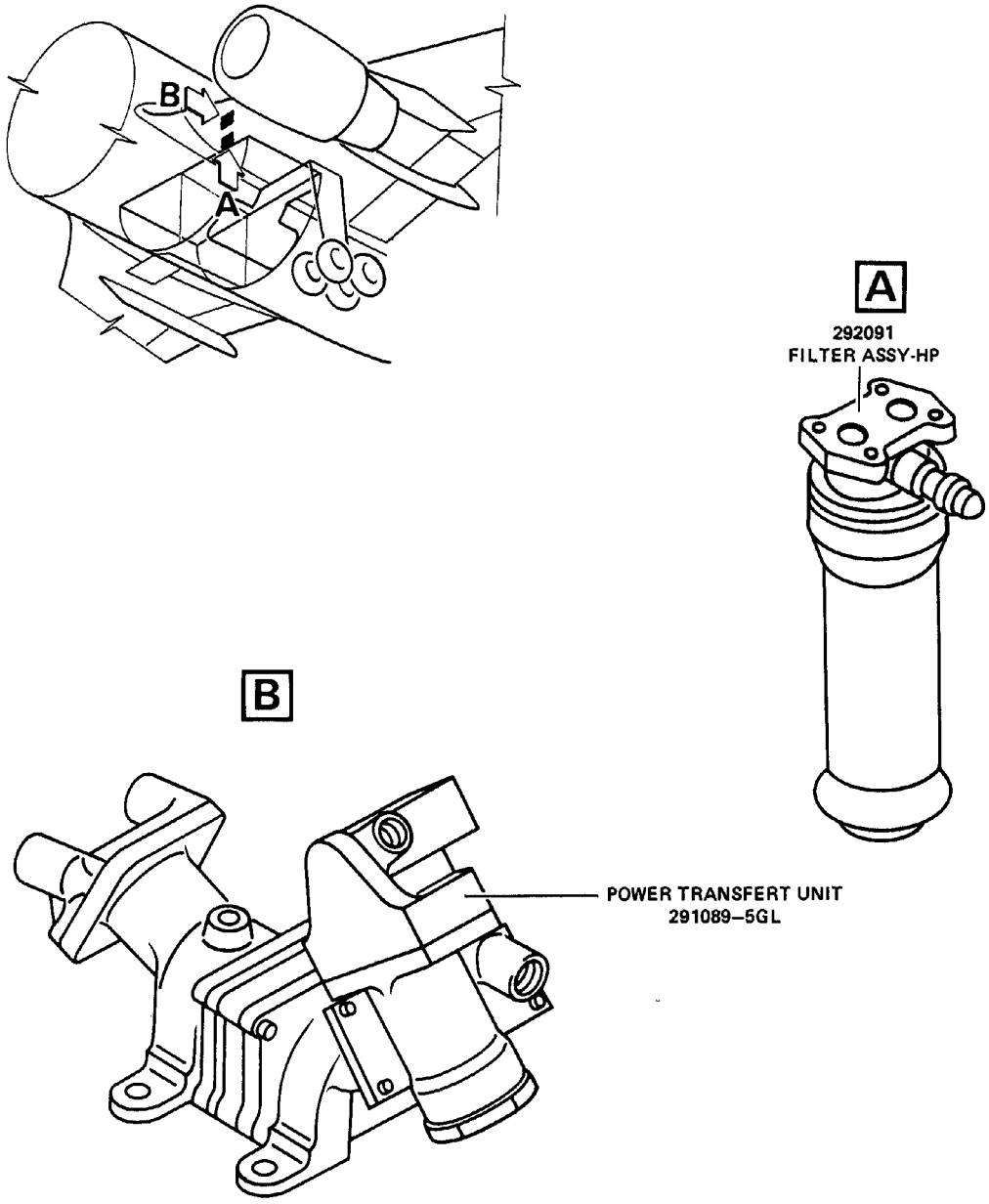
POWER TRANSFER UNIT



P - PRESSURE
R - RETURN
S - SUCTION

BM5 29 22 00 0 AAMO – 15

Power Transfer Unit - Schematic
Figure 002



BM5 29 22 00 0 BTM0 – 00

Component Location
Figure 003

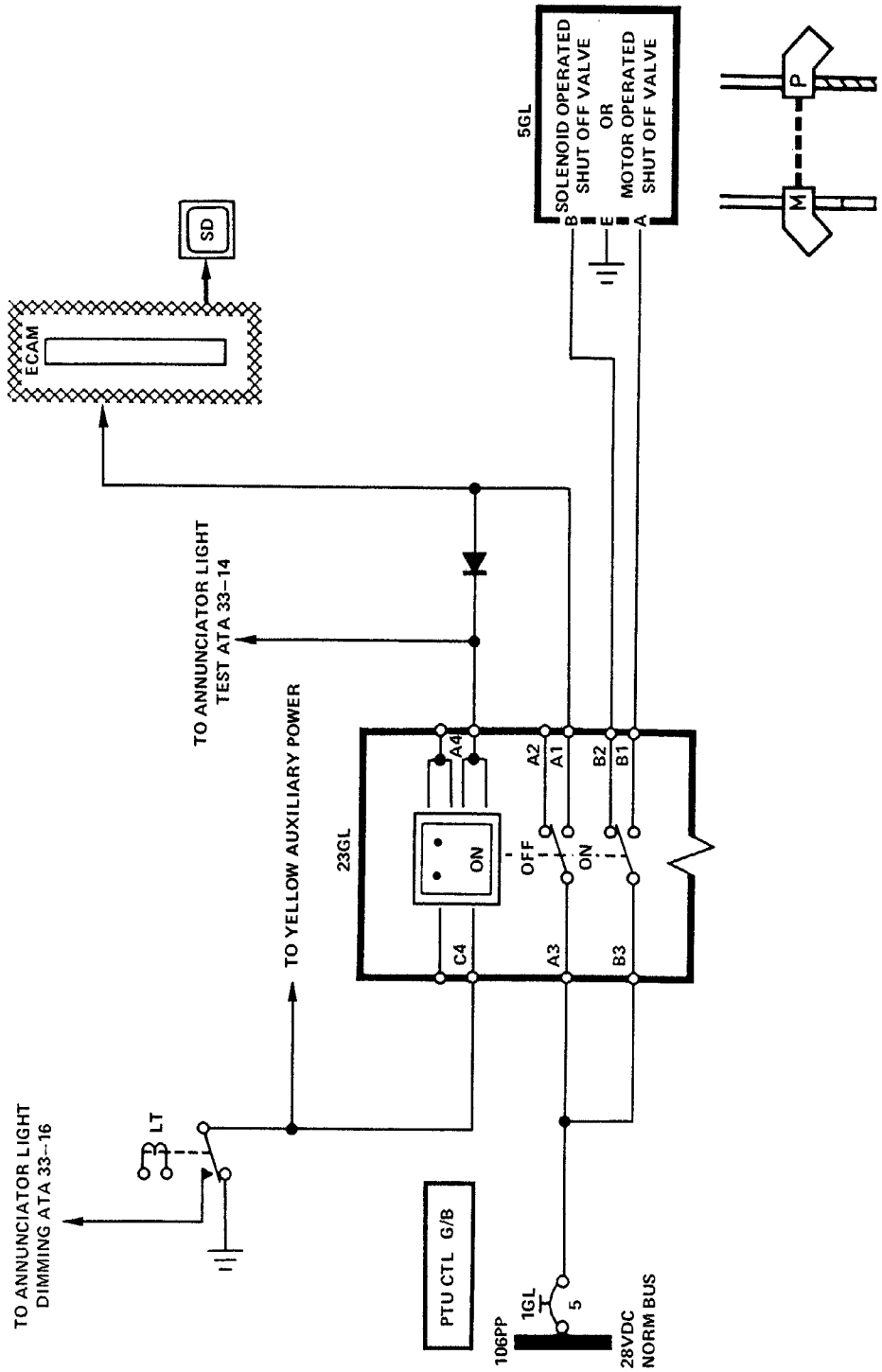
3. Performance

	Pump	Motor
Nominal delivery	91 l/mn	121 l/mn
Nominal pressure at nominal delivery	2500 psi	2500 psi min differential between inlet and outlet
Max pressure, transfer unit with low delivery	3000 psi (3400 psi,) exceptionally provided that associated **SERVO CTL** pushbutton switch is in the **OFF** position)	3000 psi differential between inlet and outlet
Suction pressure or nominal pressure	35 psig	100 psig
Max flow in case drain	8 l/mn	8 l/mn
Max flow across motor (flow limiter setting)		125 l/mn

4. Location - Installation

The power transfer unit is located in the L wing triangular bay (Blue hydraulics compartment). It is attached through flexible fittings to a rigid mount, integral with the aircraft structure.
All lines connected to the motor (pressure, return, case drain) and to the pump (suction, pressure, case drain) are teflon hoses covered with stainless steel braid.
The transfer unit is installed with respect to the Blue system reservoir in such a way that there is a constant head of fluid.

(Ref. Fig. 004)
The transfer unit is started up by means of a PTU pushbutton switch located on overhead panel 427VU, (the transfer unit is activated when the pushbutton switch is pressed in).



BM5 29 22 00 0 AEMO - 15

Blue Auxiliary Power - PTU Control
Figure 004

BLUE AUXILIARY POWER (POWER TRANSFER UNIT) - SERVICING

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT THE ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELEIVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT GREEN HYDRAULIC RESERVOIR IS PRESSURIZED IN ORDER TO AVOID CAVITATION OF ELECTRIC PUMPS DURING OPERATION.

1. Reason for the Job

Pressurization of Blue Hydraulic System Using Green/Blue Power Transfer Unit

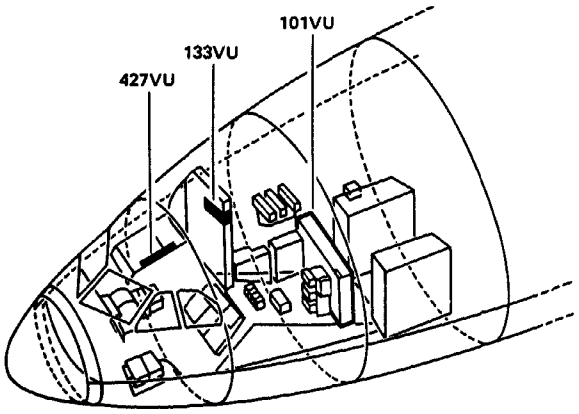
2. Equipment and Materials

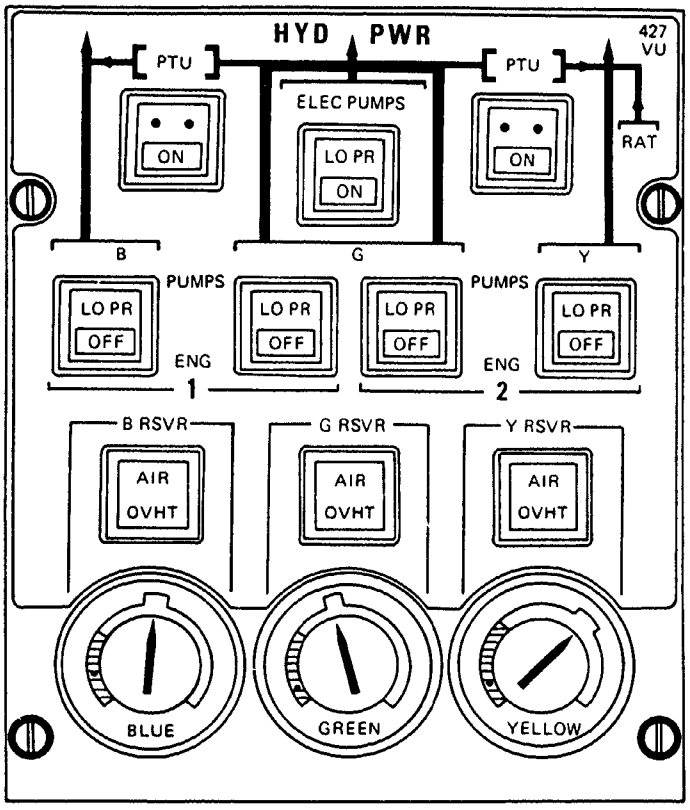
ITEM	DESIGNATION
Referenced Prodecures	
- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power-Pressurization/Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-21-00, P. Block 301	Green Auxiliary Power
- 24-41-00, P. Block 301	AC External Power Control

3. Procedure

(Ref. Fig. 301)

A. Job Set-Up
(1)Check hydraulic reservoir fluid level, top up if required (Ref. 12-12-29, P. Block 1).
(2)Close the following circuit breakers :





BM5 29 22 00 3 ADMO-43

Green/Blue Power Transfer Unit Start-Up
Figure 301

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		LINE 108
101VU	HYD/PUMP	1GE	GEN1/B08
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMP/WARN	4GE	331/V60
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	PTU CTL/G/B	1GL	332/U59

(3) On center instrument panel 4VU, make certain that landing gear control lever is in DOWN position. Display a warning notice prohibiting its operation.
(4) Make certain that free fall extension control handle located between first officer and 3rd occupant seats is in normal position and display a warning notice prohibiting its operation.
(5) On HYD PWR panel 427VU, make certain that aircraft is in the following configuration :
  (a) PUMPS/ENG 1 and PUMPS/ENG 2 pushbutton switches pressed (in).
  (b) ELEC PUMPS pushbutton switch released (out).
  (c) Green/Blue PTU and Green/Yellow PTU pushbutton switches released (out).
(6) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(7) Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301 or 29-21-00, P. Block 301).
(8) On HYD PWR panel 427VU, make certain that AIR and OVHT legends are off.

B. Green/Blue Power Transfer Unit Start-Up
On HYD PWR panel 427VU :
(1) Press Green/Blue PTU pushbutton switch, ON legend comes on.
(2) On ECAM control panel, press HYD pushbutton switch, HYD page appears on right ECAM display unit. Check that BLUE system page reads 3000psi (206 bars)

C. Close-Up
(1) Release Green/Blue PTU pushbutton switch, ON legend goes off.
(2) Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(3) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

BLUE AUXILIARY POWER
ADJUSTMENT/TEST

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEMS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED AND SAFETY PRECAUTIONS OBSERVED.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
MAKE CERTAIN THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Operational Test

A. Reason for the Job

To test Green/Blue indicating circuits and Green/Blue power transfer unit operation.

WARNING : MAKE CERTAIN THAT THE GREEN RESERVOIR IS PRESSURIZED TO AVOID ELECTRIC PUMPS CAVITATION DURING THEIR OPERATION.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear, Main Door - (Ground Door(s) Opening)

C. Procedure

(1)Job set-up

(a)Initial conditions

1 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		Line 108
21VU	SDAC and FWC2		Line 109
101VU	HYD PUMP	1GE	GEN 1/B 8
101VU	HYD/PUMP	2GE	GEN 2/B11
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RAT/TEST	1GF	331/V59

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	SRVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/MAN	153LP	323/M83

2 In flight compartment on main instrument panel, panel 4VU, make certain that landing gear control lever is in **DOWN** position.

(b) Open one main gear door (Ref. 32-12-11, P. Block 301).

(c) Open ground service panel access doors Green (147AL), Blue (571DB).

(d) Check that Green (1000) and Blue (2000) reservoir quantity indications are correct.

(e) Pressurize hydraulic reservoirs if necessary (Ref. 29-14-00, P. Block 301).

(f) Make certain that there are no leaks in the various hydraulic systems.

(g) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(h) Make certain that electronics racks ventilation is correct.

(j) In flight compartment, make certain that the aircraft is in the following configuration :

1 On **HYD PWR** panel 427VU
PTU pushbutton switches released (out), **ON** legends off.
ELEC PUMPS pushbutton switch released (out), **ON** and **LO PR** legends off.
PUMPS ENG 1 and 2 pushbutton switches released out, **OFF** legends on.
GREEN (2GQ) and **BLUE (3GQ)** quantity indicator pointers in green segment.
Green and Blue systems hydraulic pressure should be zero.
Annunciator **AIR, OVHT** legends off.

(2) Tests

ACTION	RESULT
1. On **ECAM** control panel press (in) **HYD** pushbutton switch	On right **ECAM** display unit, **HYD** page appears. - Check that configuration enumerated above is correct.
2. Annunciator lights test	

ACTION	RESULT
A. On panel 436VU - place ANN LT switch in TEST position	On panel 427VU, - PTU pushbutton switches ON legends come on - ELEC PUMPS pushbutton switch LO PR and ON legends come on - The four PUMPS ENG 1 and 2 pushbutton switches LO PR and OFF legends come on - Annunciators AIR and OVHT legends come on
B. On panel 436VU, - place ANN LT switch in BRT position.	On panel 427VU, - legends return to initial configuration.
3. On panel 427VU, - press (in) ELEC PUMPS pushbutton switch	On panel 427VU, - ON and LO PR legends come on On right ECAM display unit. - electric pump box display indicates LO (amber display) and liaison line comes on amber. Pressure read on indicator increases. When pressure reaches approx. 1750 psi (120 bars), On panel 427VU. - on ELEC PUMPS pushbutton switch, LO PR legend goes off and ON legend remains on. - On right ECAM display unit - electric pump box display is "in line" (green display) and liaison line comes on green. - Pressure increases to approx. 3000 psi. (206 bars).
4. On panel 427VU, - press (in) PTU G/B push-button switch	On panel 427VU, - PTU G/B pushbutton switch ON legend comes on. On right ECAM display unit, - interior of Green/Blue power transfer unit indicating triangle comes on green and liaison line (green) appears. - Blue hydraulic pressure indicator reading increases to 2500 psi

R

ACTION	RESULT
R	(172 bars).
5. On panel 427VU, - release (out) PTU G/B push-button switch	On panel 427VU, - PTU G/B pushbutton switch ON legend goes off. On right ECAM display unit, - interior of Green/Blue power transfer unit indicating triangle goes off and at the same time liaison line disappears. - Blue hydraulic pressure indicator reading decreases.
6. On panel 427VU, - release (out) ELEC PUMPS push-button switch.	On panel 427VU. - ELEC PUMPS pushbutton switch ON legend goes off

(3)Close-up
(a)In flight compartment, make certain that the aircraft is in the following configuration :
1 On HYD PWR panel 427VU :
PUMPS ENG1 and 2 pushbutton switches pressed (in), OFF legends off.
(b)De-energize the aircraft electrical network.
(c)Remove access platform.
(d)Close main gear door (Ref. 32-12-11, P. Block 301).

2. Functional Test

A. Reason for the Job
(1)To test Green/Blue power transfer unit operation

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(1)Job set-up
(a)Initial conditions
1 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		Line 108
21VU	SDAC and FWC2		Line 109
101VU	HYD PUMP	1GE	GEN 1/B 8
101VU	HYD/PUMP	2GE	GEN 2/B11
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RAT/TEST	1GF	331/V59
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	SRVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/MAN	153LP	323/M83

2 In flight compartment on main instrument panel, panel 4VU, make certain that landing gear control lever is in DOWN position.
(b)Open one main gear door (Ref. 32-12-11, P. Block 301).
(c)Open ground service panel access door Blue (571DB).
(d)Check that Green (1000) and Blue (2000) reservoir quantity indications

are correct.

(e)Connect hydraulic ground power cart to ground connectors 2006 and 2008 of Blue hydraulic power system.

(f)Pressurize hydraulic reservoirs if necessary, (Ref. 29-14-00, P. Block 301).

(g)Make certain that there are no leaks in the various hydraulic systems.

(i)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(j)Make certain that electronics racks ventilation is correct.

(k)In flight compartment, make certain that the aircraft is in the following configuration.

1 On panel 427VU

PTU pushbutton switches released (out), ON legends off

ELEC PUMPS pushbutton switch released (out), ON and LO PR legends off.

PUMPS ENG 1 and 2 pushbutton switches released (out)

OFF legends on

GREEN and BLUE hydraulic quantity indicator pointers in green segment.

Annunciator AIR and OVHT legends off.

(2)Tests

ACTION	RESULT
1. Using Green electric pumps pressurize Green hydraulic system to 3000 psi (206 bars) Using hydraulic ground power cart pressurize Blue hydraulic system to 3000 psi (206 bars)	On right ECAM display unit. - Green and Blue systems hydraulic pressure is 3000 psi (206 bars)
2. On panel 427VU, - press (in) PTU pushbutton switch (23GL)	In hydraulics compartment - Green/Blue power transfer unit starts up. On panel 427VU. - PTU pushbutton switch (23GL) ON legend comes on On right ECAM display unit, - interior of Green/Blue power transfer unit indicating triangle comes on green and liaison line (green) appears.
3. On Blue system hydraulic ground power cart slowly drop pressure towards zero	On right ECAM display unit. - make certain that pressure indicated (Blue system) does not decrease below 2500 psi (172 bars).
4. On panel 427VU, press and release PTU pushbutton switch (23GL)	In hydraulics compartment. - Green/Blue power transfer unit stops On panel 427VU. - PTU pushbutton switch (23GL) ON legend goes off

ACTION	RESULT
	On right ECAM display unit. - interior of Green/Blue power transfer unit indicating triangle goes off and at the same time liaison line disappears. - Blue system hydraulic pressure is zero.
5. On panel 427VU, release ELEC PUMPS pushbutton switch - Green hydraulic pressure drops	

(3)Close-up
(a)Shut down and disconnect hydraulic ground power cart.
R (b)In flight compartment, make certain that the aircraft is in the
R following configuration :
R 1 On HYD PWR panel 427VU :
R PUMPS ENG1 and 2 pushbutton switches pressed (in), OFF legends off.
R (c)De-energize the aircraft electrical network.
R (d)Remove access platform.
R (e)Close main gear door (Ref. 32-12-11, P. Block 301).

POWER TRANSFER UNIT - GREEN/BLUE 291089 - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A. 97A29102062000	Connector-Depressurizing - Hydraulic Tank
B. 97A29102035000	Connector-Pressurizing, Hydraulic Tank
C.	Compressed Air Cylinder
D.	Access Platform 2.60 m (8 ft. 6 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 24-41-00, P. Block 301	AC External Power Control
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up
(1)In flight compartment, on HYD PWR panel 427VU :
- make certain that Green and Blue hydraulic systems are in the following configuration :
(a)ELEC PUMPS pushbutton switch released (out)
(b)PTU/G/B pushbutton switch released (out)
(c)PUMPS ENG1 and PUMPS ENG 2 pushbutton switches pressed (in).
(d)Display a warning notice prohibiting pressurization of Green and Blue hydraulic systems.

(2)Display warning notices on Green and Blue ground connectors prohibiting pressurization of hydraulic systems.

(3)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59

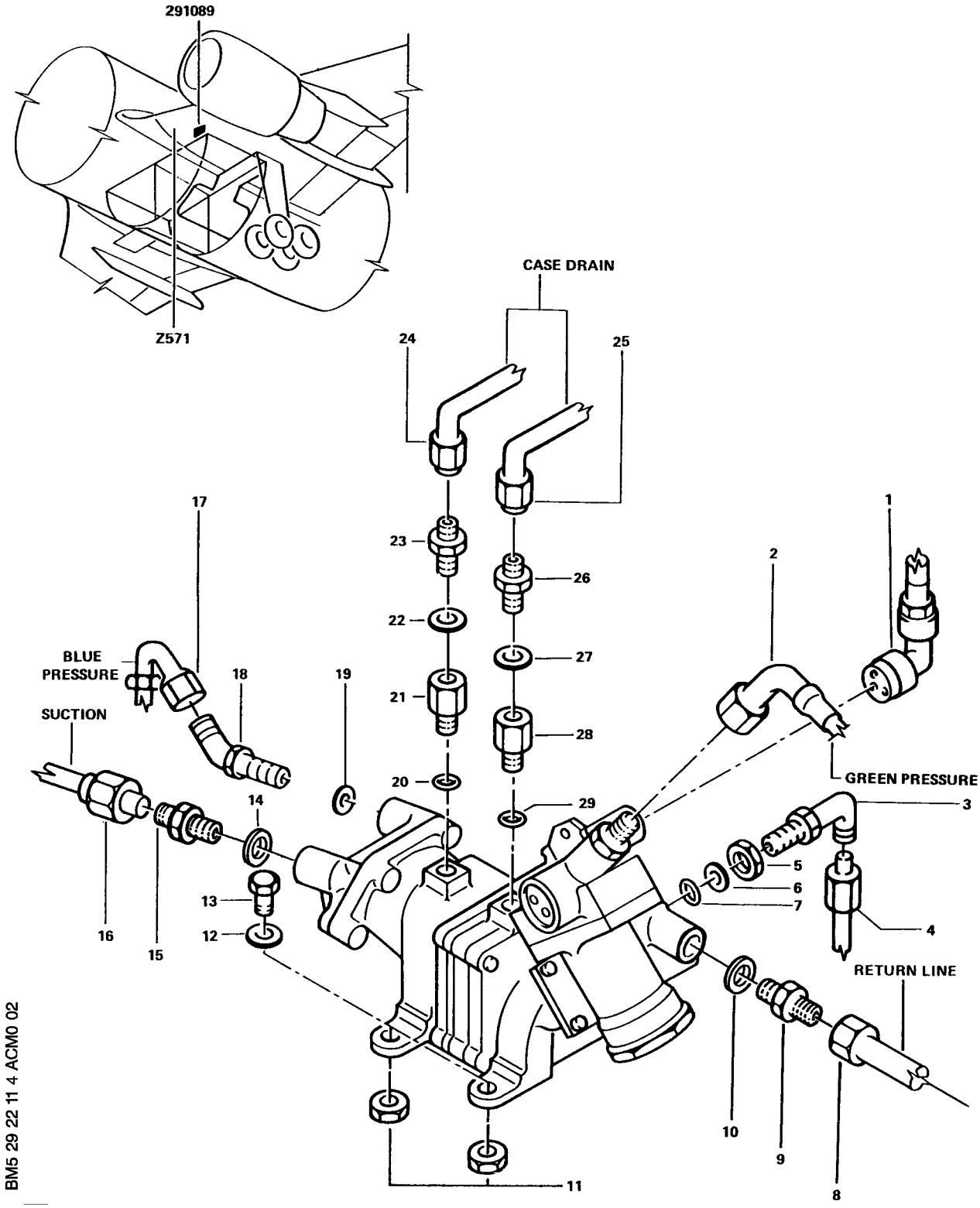
(4)Depressurize Green and Blue hydraulic systems (Ref. 29-10-00, P. Block 301).
(5)Depressurize Green and Blue hydraulic reservoirs (Ref. 29-14-00, P. Block 301). Display warning notice prohibiting their pressurization.

(6)Open left main landing gear door (Ref. 32-12-11, P. Block 301).
(7)Position access platform in zone 571.
(8)Position containers and absorbant material under lines of power transfer unit (PTU) to be removed.

B. Removal
(Ref. Fig. 401)
NOTE : Disconnected lines shall be blanked with plugs. Threads of removed components shall be protected with plugs or caps.
(1)Disconnect electrical connector (1).
(2)Disconnect Blue pressure coupling (17) and Blue suction coupling (16).
(3)Disconnect Green pressure coupling (2) and Green return coupling (8).
R (4)Disconnect coupling (24) of case drain line (Blue system pump) and
R coupling (25) of case drain line (Green system pump).
(5)Disconnect case drain line (4).
(6)Unscrew and remove the four attachment screws (13) and nuts (11). Retain washers (12).
(7)Remove PTU.

C. Preparation of Replacement Component
NOTE : All removed coupling and valve seals shall be systematically discarded.
(1)On removed component, remove :
R (a)Check valves (23) and (26). Discard packings (22) and (27)
R (b)Unions (21) and (28). Discard packings (20) and (29).
(c)Unions (15) and (9). Discard packings (14) and (10).
R (d)Elbow (18). Discard backup washer (19).
(e)Elbow (3) and nut (5). Discard backup washer (6) and packing (7).
NOTE : New seals shall be coated with hydraulic fluid.
(2)On replacement component, install :
(a)Unions (15) and (9) with new packings (14) and (10).
R (b)Elbow (18) with new backup washer (19).
(c)Elbow (3) with nut (5) and with new backup washer (6) and packing (7). Do not tighten nut (5).
NOTE : Power Transfer Unit is delivered full of hydraulic fluid of the same type as that used on aircraft. If this is not the case, fill or top up pump and motor units via drain case ports. Filter hydraulic fluid using a 10-micron mesh filter.
R (d)Install unions (21) and (28) with new packings (20) and (29).
R (e)Install check valves (23) and (26) with new packings (22) and (27).

D. Installation
(1)Position PTU on mounting and attach with the four screws (13) and four washers (12) and nuts (11).
(2)Connect suction line (16) to union (15).
R (3)Connect Blue pressure line (17) to elbow (18).
(4)Connect Green pressure line (2).
(5)Connect return line (8) to union (9).
(6)Connect drain line (4) to elbow (3). Tighten nut (5).
R (7)Connect case drain line (25) (Green system pump) to check valve (26).
R (8)Connect flexible bleed hose to check valve (23).



Power Transfer Unit - Green/Blue
Figure 401

R

(9)Remove warning notice. Pressurize Blue hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(10)Bleed PTU hydraulic motor.
(11)Remove flexible bleed hose. Connect case drain line (24) to check valve (23).
R (12)Perform following steps to make certain that there is no air in hydraulic
R system :
R (a)Make certain that air pressure in related hydraulic reservoir is not
R less than 3.5 bars (50 psi). If necessary, pressurize reservoir
R (Ref. 29-14-00, P. Block 301).
R (b)On related reservoir hydraulic quantity transmitter, record position of
R fluid level pointer.
R (c)Depressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301).
R (d)On related hydraulic quantity transmitter, record movement of fluid
R level pointer.
R NOTE : Movement of pointer shows an increase of fluid level in reservoir
R because of air expansion in system.
R (e)If movement of pointer between pressurized and depressurized conditions
R is more than :
R - 2 liters for Green system
R - 1.5 liters for Blue system
R repeat bleeding procedure until result is satisfactory.
(13)Connect electrical connector (1).

E. Test
(1)Remove warning notices and close circuit breakers 4 GE and 1 GL
(2)Energize the aircraft electrical network (Ref. 24-11-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(3)On ECAM control panel press HYD pushbutton switch.
(4)Using hydraulic ground power unit or Green electric pumps, pressurize Green hydraulic system to approx. 3000 psi (206 bars).
(5)On panel 427VU, press PTU G/B pushbutton switch. (ON legend comes on).
(6)On right ECAM display unit, check that Blue pressure rises to 2800 psi (193 bars).
(7)In hydraulics compartment, check for absence of leaks from connections of replaced PTU.
(8)On panel 427VU, release PTU G/B pushbutton switch (ON legend goes off).

F. Close-Up
(1)Top-up Green and Blue reservoirs if required (Ref. 12-12-29, P. Block 1).
(2)Clean working area and remove fluid recovery container and absorbant material.
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove access platform.
(5)Close left main gear door (Ref. 32-12-11, P. Block 301).
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

HP FILTER BLUE 292091 (YELLOW 293090) - SERVICING

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION. BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Reason for the Job

NOTE : As removal/installation of both HP filters is identical only replacement of Blue filter element is described.
For Yellow filter element relevant information is in parentheses.

A. Replacement of Filter Element

2. Equipment and Materials

ITEM	DESIGNATION
A.	Compressed Air Cylinder
B.	Access Platform, 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main (Hydraulic Power)
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure

A. Job Set-Up

(1)On HYD PWR panel 427VU, make certain that aircraft is in the following configuration.

(a)PUMPS ENG 1 and PUMPS ENG 2 pushbutton switches released (out).

(b)ELEC PUMPS pushbutton switch released (out).

(c)Green/Blue and Green/Yellow PTU pushbutton switches released (out).

(2)On HYD PWR panel 427VU, display a warning notice prohibiting operation of Green/Blue (Green/Yellow) PTU pushbutton switches.

(3)Display a warning notice on Blue (Yellow) system ground connectors.

(4)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG2/PUMP CTL/Y	1GD	332/U57

(5)Open main gear main doors (Ref. 32-12-11, P. Block 301)

(6)Install access platform

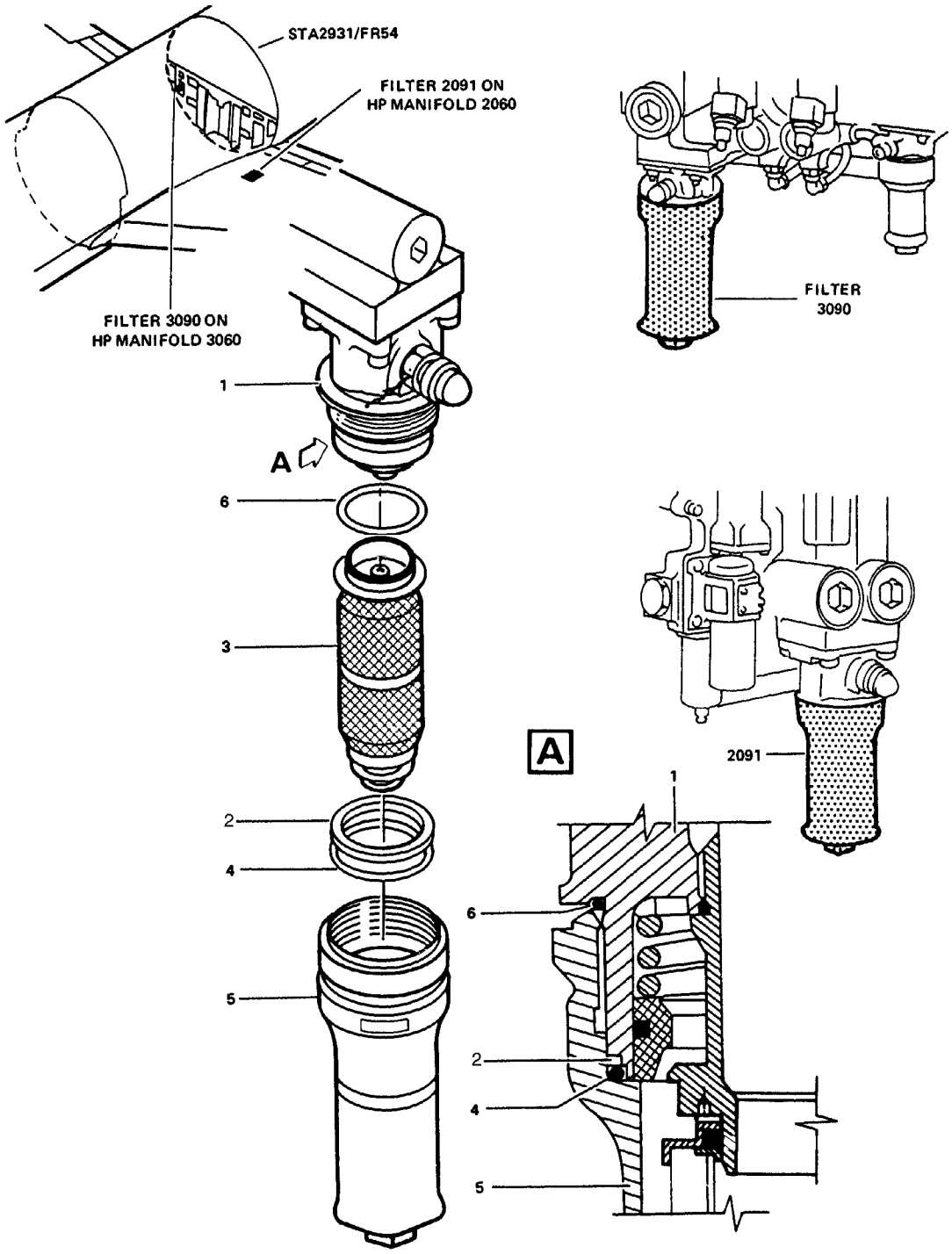
(7)Depressurize Blue (Yellow) hydraulic system (Ref. 29-10-00, P. Block 301)
(8)Depressurize Blue (Yellow) system reservoir (Ref. 29-14-00, P. Block 301)

B. Removal of Filter Element
(Ref. Fig. 301)
(1)Cut and remove lockwire between filter head (1) and bowl (5).
(2)Unscrew bowl (5)
(3)Discard O-ring (6) from filter head (1)
R (4)Discard O-ring (4) and back-up ring (2).
R (5)Remove filter element (3) from bowl (5) and discard it, if it is not of
R cleanable type.
NOTE : If filter element (3) is re-usable and if it cannot be cleaned immediately after removal, immerse it in hydraulic fluid after having blanked off its outlet port.
R

C. Installation
CAUTION : INSTALL NEW OR RECONDITIONED FILTER ELEMENT. FOR A RE-USABLE FILTER ELEMENT, CLEANING MUST BE PERFORMED IN AN ULTRASONIC TANK AND BE FOLLOWED BY A PERFORMANCE TEST. BEFORE INSTALLATION, NEW O-RINGS MUST BE COATED WITH HYDRAULIC FLUID.
R (1)Install new O-ring (4) and new back-up ring (2) on bowl (5).
R (2)Install new filter element (3) in bowl (5), or a filter element (3)
R previously cleaned then dried off with clean and dry compressed air.
R (3)Install new O-ring (6) on filter head (1).
R (4)Position bowl/filter element assembly under filter head (1).
R (5)Tighten bowl (5) home. MAXIMUM TORQUE : 4 m.daN (30 lbf.ft.)
R (6)Wirelock bowl (5)
R (7)Press clogging indicator if protruding

D. Test
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2)Top up hydraulic reservoirs (Ref. 12-12-29, P. Block 1)
(3)Remove warning notice from Blue (Yellow) system ground connectors.
(4)Pressurize Blue (Yellow) hydraulic system using Green/Blue (Green/Yellow) power transfer unit (Ref. 29-22-00, P. Block 301, 29-23-00, P. Block 301).
(5)Check filters 292091 (293090) for leakage.

E. Close-Up
(1)Shut down hydraulic power
(2)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(3)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(4)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(5)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



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Replacement of HP Filter Element
Figure 301

R

CHECK VALVE - GREEN/BLUE POWER TRANSFER UNIT DELIVERY - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Caps/Plugs
(2)	Circuit Breaker(s) Safety Clip(s)
(3)	Warning Notices
(4)	Access Platform 2.6 m (8 ft. 8 in.)
(5)	Lockwire
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 20-23-16, P. Block 1	Installation of O-Ring Seal
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-22-00, P. Block 501	Blue Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

2. Procedure

A. Job Set-Up
(1)In flight compartment, on HYD PWR section of panel 427VU :
(a)Make certain that electric pumps are not operating (ELEC PUMPS pushbutton switch legends off).
(b)Display warning notices prohibiting pressurization and use of Blue and Green hydraulic systems.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Install access platform at zone 140.
(6)Depressurize Blue and Green hydraulic systems (Ref. 29-10-00, P. Block 301).

(7)Depressurize Blue and Green hydraulic reservoirs (Ref. 29-14-00, P. Block 301).

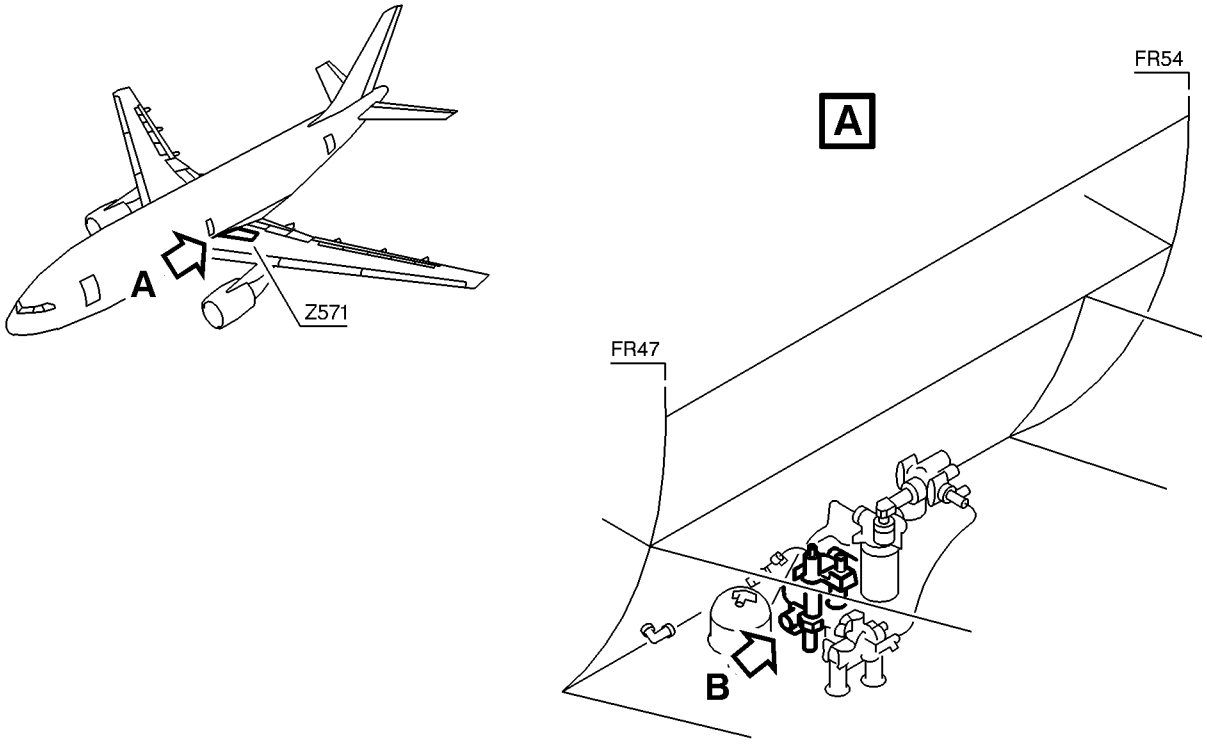
B. Removal
(Ref. Fig. 401)
(1)Remove check valve (1) and discard packing (2) (Ref. 20-23-16, P. Block 1).
(2)Install blanking plug on HP manifold (3) port.

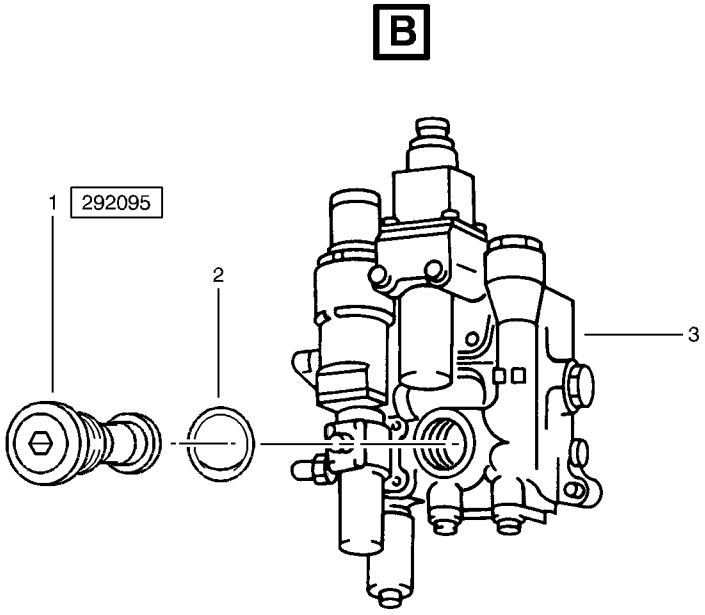
C. Preparation of Replacement Component
(1)Make sure that parts retained from removed component are clean and in correct condition.
(2)Remove blanking plug from HP manifold (3) port.

D. Installation
(1)Position new packing (2) on check valve (1) (Ref. 20-23-16, P. Block 1).
(2)Install check valve (1) on HP manifold (3) port, tighten check valve (1) and safety with lockwire.

E. Test
(1)Remove safety clips and tags and close the circuit breakers : 1GQ, 1GR, 1GL, 6GL and 4GE.
(2)Make certain that fluid level in hydraulic reservoirs is correct : add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Perform an operational test of Green/Blue power transfer unit (Ref. 29-22-00, P. Block 501).
(4)Check for hydraulic fluid leakage at check valve (1) and at HP manifold (3).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove warning notices.
(3)Remove access platform.
(4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).





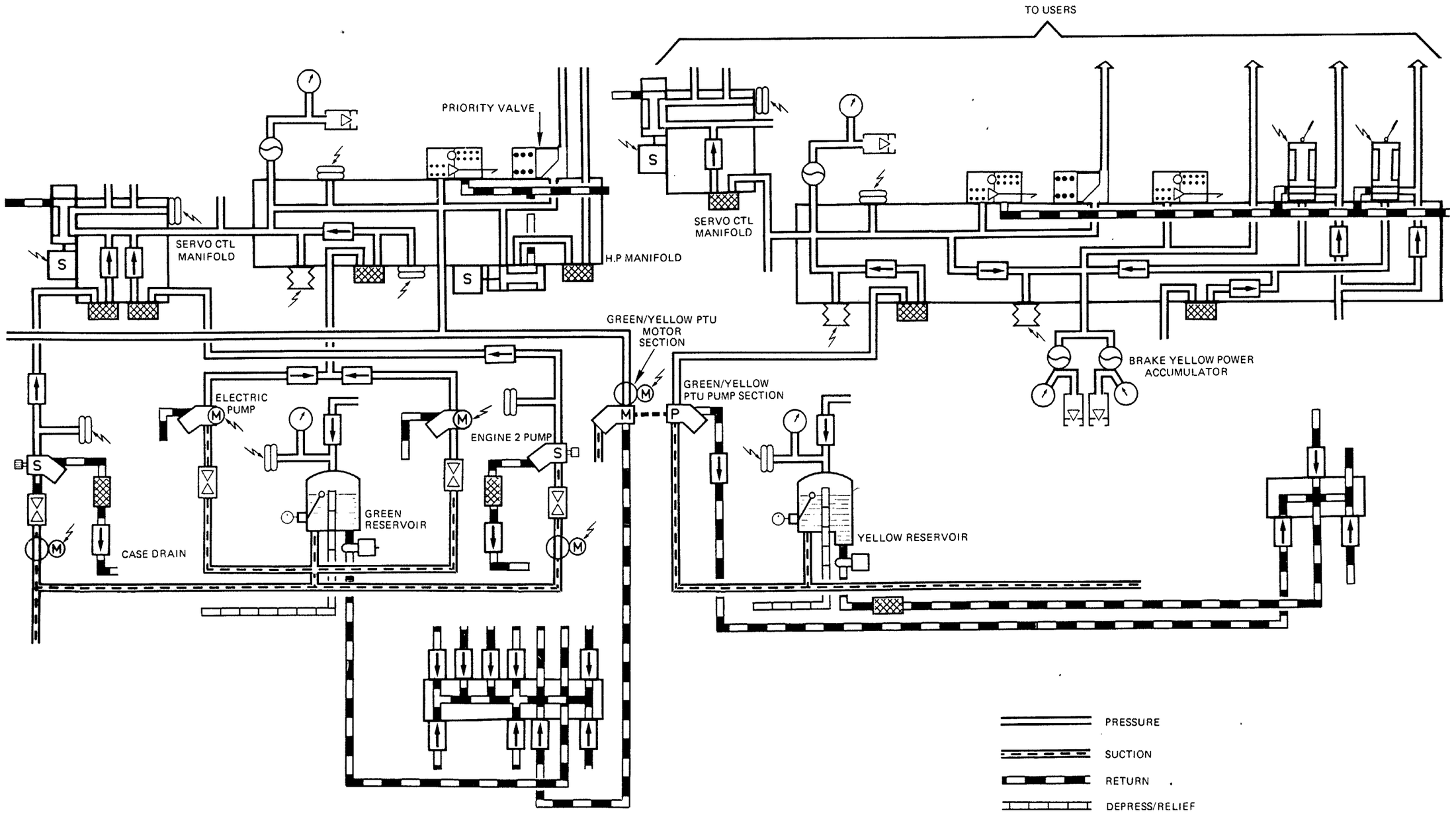
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Green/Blue Power Transfer Unit Delivery
Check Valve
Figure 401

1. Description
(Ref. Fig. 001)
The Green/Yellow power transfer unit is identical to the Green/Blue power transfer unit (Ref. 29-22). The description of its purpose and operation is identical to that of the Green/Blue power transfer unit (read Yellow instead of Blue).

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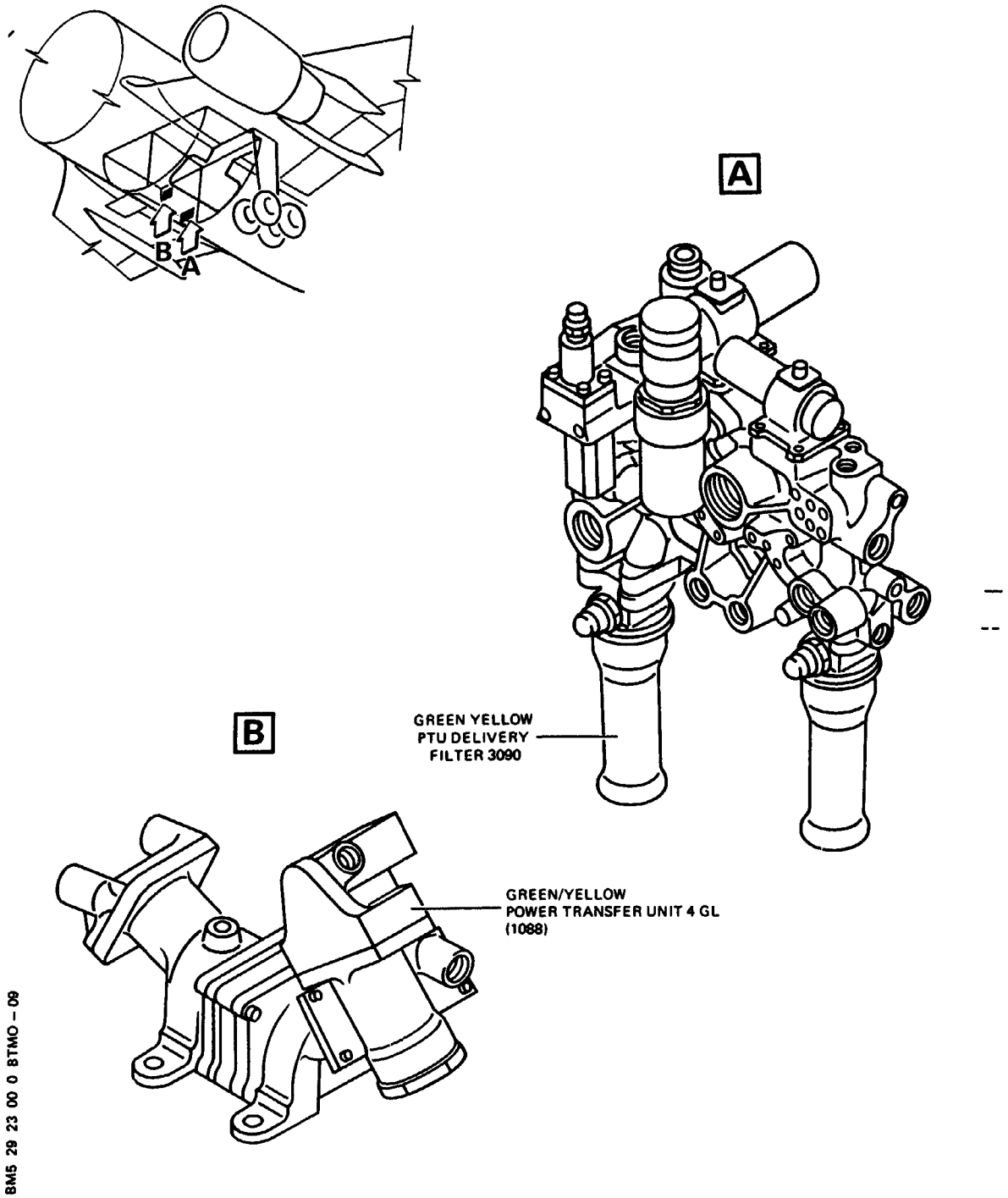
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Yellow Auxiliary Power System (Power Transfer Unit)
Figure 001

R

2. Component Location
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
293090	FILTER - G/Y PTU DELIVERY		148	734	29-23-13
4GL	POWER TRANSFER UNIT - G/Y		148	734	29-23-11



Component Location
Figure 002

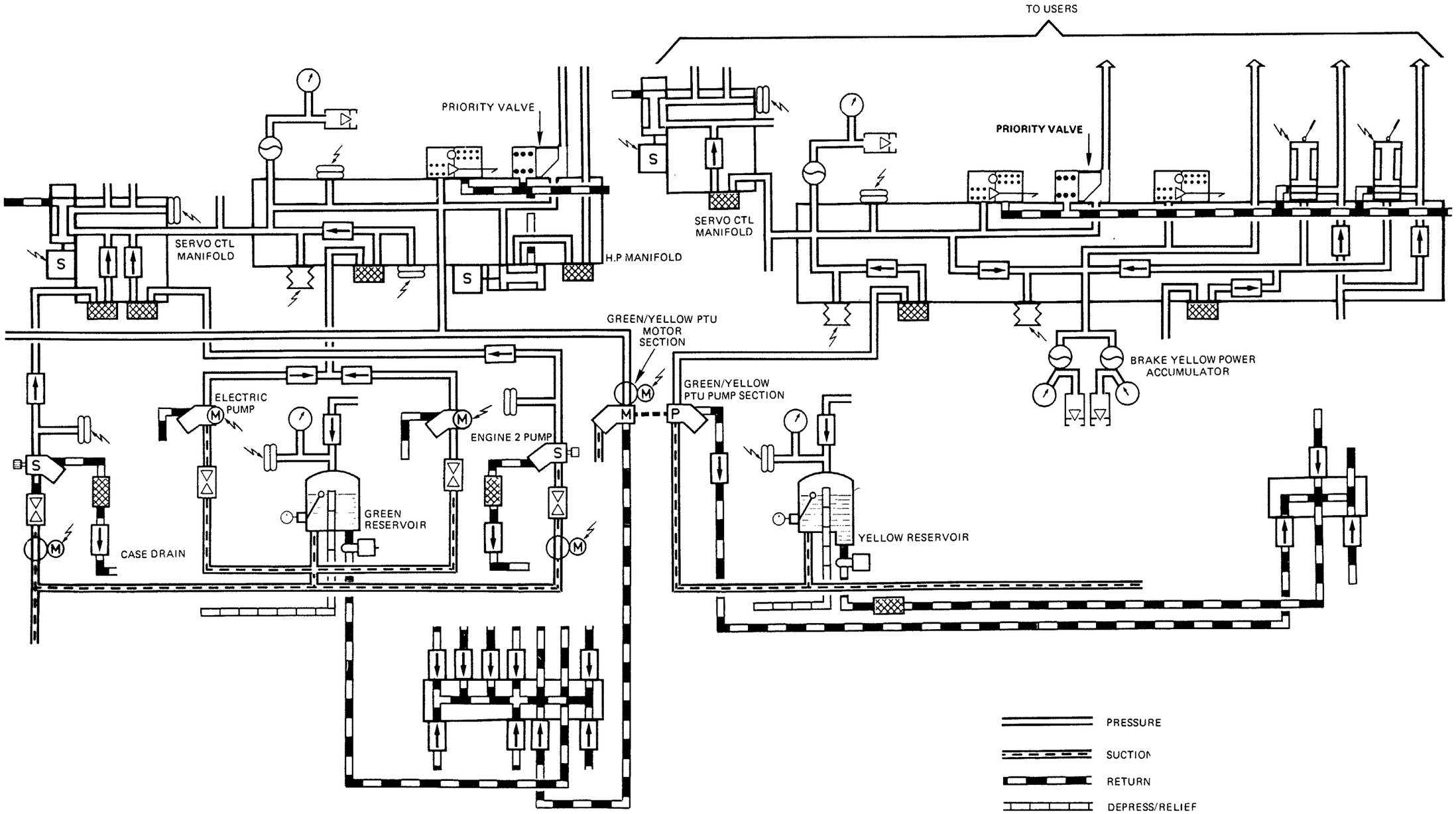
3. Performance
   Identical to that of the Green/Blue power transfer unit (Ref. 29-22).

4. Location - Installation
   The Green/Yellow power transfer unit is installed in the wing center box at FR53 on the right side of the fuselage.

5. Control
   Ref. 29-22

   (Ref. Fig. 003)

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Yellow Auxiliary Power - PTU Control
Figure 003

YELLOW AUXILIARY POWER (POWER TRANSFER UNIT) - SERVICING

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROLS, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT THE ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELEIVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT GREEN HYDRAULIC RESERVOIR IS PRESSURIZED IN ORDER TO AVOID CAVITATION OF ELECTRIC PUMPS DURING OPERATION.

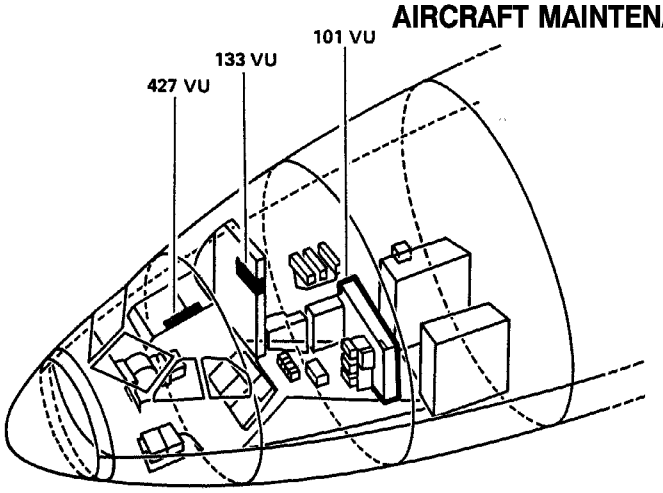
1. Reason for the Job
Pressurization of Yellow Hydraulic System Using Green/Yellow Power Transfer Unit

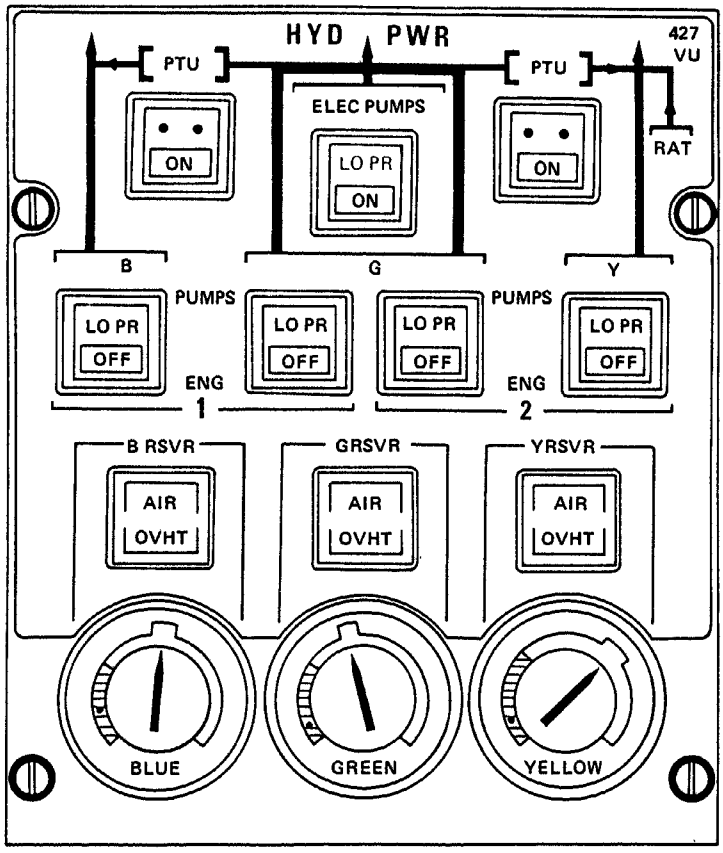
2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-21-00, P. Block 301	Green Auxiliary Power
- 24-41-00, P. Block 301	AC External Power Control

3. Procedure
(Ref. Fig. 301)

A. Job Set-Up
(1)Check hydraulic reservoir fluid level, top up if required (Ref. 12-12-29, P. Block 1).
(2)Close the following circuit breakers :





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Green/Yellow Power Transfer Unit Start-Up
Figure 301

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		LINE 108
101VU	HYD PUMP	1GE	GEN1/B08
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	HYDRAULIC/ELEC/PUMPS/WARN	4GE	331/V60
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	HYDRAULIC/ENG/PUMPS/WARN	5GD	332/T57
133VU	PTU CTL/G/Y	6GL	332/U60

(3)On center instrument panel 4VU, make certain that landing gear control lever is in DOWN position. Display a warning notice prohibiting its operation.
(4)Make certain that free fall extension control handle located between first officer and 3rd occupant seats is in normal position and display a warning notice prohibiting its operation.
(5)On HYD PWR panel 427VU, make certain that aircraft is in the following configuration :
(a)PUMPS ENG 1 and PUMPS ENG 2 pushbutton switches pressed (in).
(b)ELEC PUMPS pushbutton switch released (out).
(c)Green/Blue PTU and Green/Yellow PTU pushbutton switches released (out).
(6)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(7)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301 or 29-21-00, P. Block 301).
(8)On panel 427VU, make certain that AIR and OVHT legends are off.

B. Green/Yellow Power Transfer Unit Start-Up
(1)On HYD PWR panel 427VU :
Press Green/Yellow PTU pushbutton switch, ON legend comes on.
(2)On ECAM control panel, press HYD pushbutton switch, HYD page appears on right ECAM display unit. Check that YELLOW system page reads 3000 psi (206 bars).

C. Close-Up
(1)On panel 427VU
Release Green/Yellow PTU pushbutton switch, ON legend goes off.
(2)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(3)De-energize the aircraft electrical network.
(Ref. 24-41-00, P. Block 301).
(4)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEMS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED AND SAFETY PRECAUTIONS OBSERVED.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
MAKE CERTAIN THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Operational Test

A. Reason for the Job

To test Green and Yellow indicating circuits and Green/Yellow power transfer unit operation.

WARNING : MAKE CERTAIN THAT GREEN RESERVOIR IS PRESSURIZED TO AVOID ELECTRIC PUMPS CAVITATION DURING THEIR OPERATION.

B. Equipment and Materials

ITEM	DESIGNATION
	Access Platform 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear, Main Door - (Ground Door(s) Opening)

C. Procedure

(1)Job set-up

(a)Initial conditions

1 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		LINE 108
21VU	SDAC and FWC2		LINE 109
101VU	HYD PUMP	1GE	GEN1/B 8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RAT/TEST	1GF	331/V59

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	SRVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/AUTO	153LP	323/M83

R 2 In flight compartment on main instrument panel, panel 4VU,
R make certain that landing gear control lever is in
R DOWN position.
R (b)Open one main gear door (Ref. 32-12-11, P. Block 301).
R (c)Open ground service panel access doors (147AL) Green (671DB) Yellow
(d)Check that Green (1000) and Yellow (3000) reservoir quantity indications are correct.
(e)Pressurize hydraulic reservoirs if necessary (Ref. 29-14-00, P. Block 301).
(f)Make certain that there are no leaks in the various hydraulic systems.
(g)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(h)Make certain that electronics racks ventilation is correct.
(j)In flight compartment, make certain that the aircraft is in the following configuration.
1 On HYD PWR panel 427VU
PTU pushbutton switches released (out), ON legends off.
ELEC PUMPS pushbutton switch released (out), ON and LO PR legends off.
PUMPS ENG1 and 2 pushbutton switches released (out), OFF legends on.
GREEN (2GQ) and YELLOW (4GQ) quantity indicator pointers in Green segment.
Green and Yellow systems hydraulic pressure should be zero.
Annunciator AIR and OVHT legends off.

(2)Tests

ACTION	RESULT
1. On ECAM control panel press (in) HYD pushbutton switch	On right ECAM display unit, HYD page appears. Check that configuration enumerated above is correct.
2. Annunciator lights test	
A. On panel 436VU, place ANN LT switch in TEST position	On panel 427VU, PTU pushbutton switches ON legend comes on. ELEC PUMPS pushbutton switch LO PR and ON legends come on. The four PUMPS ENG 1 and 2 pushbutton switches LO PR and OFF legends come on. Annunciators AIR and OVHT legends come on.
B. On panel 436VU, place ANN LT switch in BRT position	On panel 427VU, legends return to initial configuration.
3. On panel 427VU, Press (in) ELEC PUMPS pushbutton switch	On panel 427VU, ON and LO PR legends come on On right ECAM display unit, electric pump box display indicates LO (amber display) and liaison line comes on amber. Pressure read on indicator increases. When pressure reaches approx. 1750 psi (120 bars), on panel 427VU, on ELEC PUMPS pushbutton switch, LO PR legend goes off and ON legend remains on. On right ECAM display unit electric pump box display is "in line" (green display) and liaison line comes on green. Pressure increases to approx. 3000 psi. (206 bars).
4. On panel 427VU, Press (in) PTU G/Y pushbutton switch	On panel 427VU, PTU G/Y pushbutton switch ON legend comes on. On right ECAM display unit, interior of Green/Yellow power transfer unit indicating triangle comes on green and liaison line (green) appears. Yellow hydraulic pressure indicator

ACTION	RESULT
	reading increases to 2500 psi (172 bars).
5. On panel 427VU, Release (out) PTU G/Y pushbutton switch	On panel 427VU, PTU G/Y pushbutton switch ON legend goes off. On right ECAM display unit, interior of Green/Yellow power transfer unit indicating triangle goes off and at the same time liaison line disappears. Yellow hydraulic pressure indicator reading decreases.
6. On panel 427VU, Release ELEC PUMPS pushbutton switch	On panel 427VU, ELEC PUMPS pushbutton switch ON legend goes off.

(3)Close-up
(a)In flight compartment, make certain that the aircraft is in the following configuration :
1 On HYD PWR panel 427VU :
PUMPS ENG1 and 2 pushbutton switches pressed (in), OFF legends off.
(b)De-energize the aircraft electrical network.
R (c)Close access doors.
R (d)Remove access platform
R (e)Close main gear door (Ref. 32-12-11, P. Block 301).

2. Functional Test

A. Reason for the Job
(1)To test Green/Yellow power transfer unit operation.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 8 in.)
(2)	Hydraulic Ground Power Carts
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(1)Job set-up
(a)Initial Conditions
1 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		LINE 108
21VU	SDAC and FWC2		LINE 109
101VU	HYD PUMP	1GE	GEN1/B 8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RAT/TEST	1GF	331/V59
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	SRVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/AUTO	153LP	323/M83

R 2 In flight compartment on main instrument panel, panel 4VU,
R make certain that landing gear control lever is in DOWN
R position.

R (b) Open one main gear door (Ref. 32-12-11, P. Block 301).

R (c) Open access door 671DB to ground connector.

(d) Check that Green (1000) and Yellow (3000) reservoir quantity indications are correct.

(e) Connect hydraulic ground power cart to ground connectors 3006 and 3008 of Yellow hydraulic power system.

(f) Pressurize hydraulic reservoirs if necessary, (Ref. 29-14-00, P. Block 301).

(g) Make certain no leaks are evidenced in the various hydraulic systems.

(h) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(j) Make certain that electronics racks ventilation is correct.

(k) In flight compartment, make certain that the aircraft is in the following configuration.

1 On panel 427VU
PTU pushbutton switches released (out), ON legends off.
ELEC PUMPS pushbutton switch released (out) ON and LO PR legends off.
PUMPS ENG 1 and 2 pushbutton switches released (out) OFF legends on.
GREEN and YELLOW hydraulic quantity indicator pointers in Green segment.
Annunciator AIR and OVHT legends off.

(2)Tests

ACTION	RESULT
1. Using Green electric pumps pressurize Green hydraulic system to 3 000 psi (206 bars). Using hydraulic ground power cart pressurize Yellow hydraulic system to 3000 psi (206 bars)	On right ECAM display unit Green and Yellow systems hydraulic pressure indication is 3000 psi (206 bars).
2. On panel 427VU, Press (in) PTU pushbutton switch (24GL)	In hydraulics compartment Green/Yellow power transfer unit starts up. On panel 427VU, PTU pushbutton switch (24GL) ON legend comes on. On right ECAM display unit, interior of Green/Yellow power transfer unit indicating triangle comes on green and liaison line (green) appears.
3. On Yellow system hydraulic ground power cart, slowly drop pressure towards zero.	On right ECAM display unit, make certain that pressure indicated (Yellow system) does not decrease below 2500 psi (172 bars).
4. On panel 427VU, Release PTU pushbutton switch (24GL)	In hydraulics compartment Green/Yellow power transfer unit stops. On panel 427VU, PTU pushbutton switch (24GL) ON legend goes off. On right ECAM display unit interior of Green/Yellow power transfer unit indicating triangle goes off and at the same time liaison line disappears.
5. On panel 427VU, release (out) ELEC PUMPS pushbutton switch. - Green hydraulic pressure drops.	Yellow system pressure indication is zero.

R (3)Close-up
R (a)Shut down and disconnect hydraulic ground power cart, close access door 671DB.
R (b)In flight compartment, make certain that the aircraft is in the following configuration :
R 1 On HYD PWR panel 427VU :
R PUMPS ENG1 and 2 pushbutton switches pressed (in), OFF legends off.
R (c)De-energize the aircraft electrical network.
R (d)Remove access platform
R (e)Close main gear main door (Ref. 32-12-11, P. Block 301).

GREEN/YELLOW POWER TRANSFER UNIT 291088
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A. 97A29102062000	Connector-Depressurizing Hydraulic Tank
B. 97A29102035000	Connector-Pressurizing Hydraulic Tank
C.	Compressed Air Source
D.	Access Platform, 2.60 m (8 ft. 6 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 24-41-00, P. Block 301	AC External Power Control
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening).

2. Procedure

A. Job Set-Up
(1)In flight compartment, on HYD PWR panel 427VU, make certain that Green and Yellow hydraulic systems are in the following configuration.
(a)ELEC PUMPS pushbutton switch released (out).
(b)PTU G/Y pushbutton switch released (out).
(c)PUMPS ENG 1 and PUMPS ENG 2 pushbutton switches pressed (in).
(d)Display a warning notice prohibiting pressurization of Green and Yellow hydraulic systems.
(2)Display a warning notice on Green and Yellow ground connectors prohibiting pressurization of hydraulic systems.
(3)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(4)Depressurize Green and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(5)Depressurize Green and Yellow hydraulic system reservoirs (Ref. 29-14-00, P. Block 301).

(6)Display a warning notice prohibiting pressurization of hydraulic reservoirs.
(7)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(8)Install access platform.
(9)Install containers and absorbent material under connections of power transfer unit to be removed.

B. Removal (Ref. Fig. 401)
NOTE : Removed line couplings shall be blanked using caps/plugs.
Threads of removed equipment shall be protected using blanking caps/plugs.
(1)Disconnect electrical connector (1).
(2)Disconnect Yellow system pressure coupling (15) and suction coupling (14).
(3)Disconnect Green system pressure coupling (26) and return line (6).
(4)Disconnect case drain (Yellow system pump) coupling (25) and case drain (Green system pump) coupling (24).
(5)Disconnect drain line (2) by loosening clamp (3).
(6)Remove the 4 attachment screws (11) and nuts (9). Retain washers (10).
(7)Remove power transfer unit.

C. Preparation of Replacement Component
NOTE : Removed coupling or valve seals shall be systematically replaced.
(1)On removed component, remove :
(a)Check valves (20) and (23). Discard packings (21) and (22).
(b)Unions (13) and (7) and discard packings (12) and (8).
(c)Elbow (16), and nut (17). Discard backup washer (18) and packing (19)
(d)Straight coupling (4), discard packing (5).
NOTE : New seals shall be coated with hydraulic fluid.
(2)On replacement component, install
R CAUTION : TAKE CARE TO INSTALL CHECK VALVES (20) AND (23) IN PROPER
R DIRECTION, ARROWS ON CHECK VALVES POINTING OUTBOARD WITH
R RESPECT TO PTU.
(a)Unions (13) and (7) with new packings (12) and (8).
(b)Elbow (16), with nut (17) and with new backup washer (18) and new packing (19). Do not tighten nut (17).
(c)Straight coupling (4) with new packing (5).
NOTE : Power transfer unit is delivered full of hydraulic fluid of the same type as that used in aircraft.
If this is not the case, fill or top up pump and motor units
R via case drain ports. Filter the hydraulic fluid using a
10 micron mesh filter.
(d)Install check valve (20) with new packing (21) and check valve (23) with new packing (22).

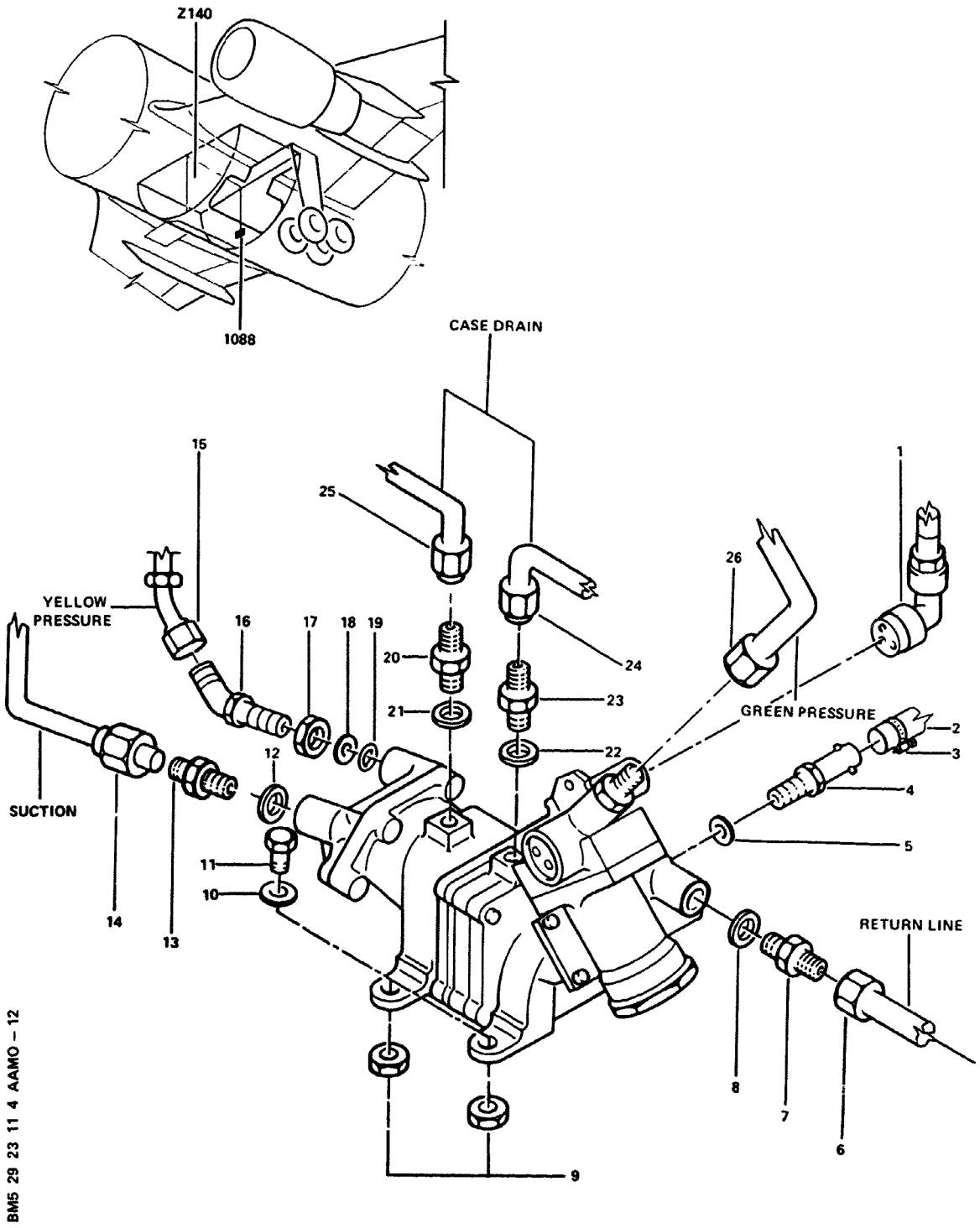
D. Installation
(1)Install power transfer unit on its support plate and attach using washers (10) and the 4 screws (11) and nuts (9).
(2)Connect suction coupling (14) to union (13).
(3)Connect Yellow system pressure line (15) to elbow (16), tighten nut (17).
(4)Connect Green system pressure line (26).

(5)Connect return line (6) to union (7).
(6)Connect drain line (2) to straight coupling (4), install and tighten clamp (3).
(7)Connect motor unit case drain line coupling (24) to check valve (23).
(8)Connect bleed hose to check valve (20).
(9)Remove warning notice. Pressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(10)Bleed power transfer unit pump.
(11)Remove bleed hose and connect case drain line (25) to check valve (20).
(12)Perform following steps to make certain that there is no air in hydraulic system :
(a)Make certain that air pressure in related hydraulic reservoir is not less than 3.5 bars (50 psi). If necessary, pressurize reservoir (Ref. 29-14-00, P. Block 301).
(b)On related reservoir hydraulic quantity transmitter, record position of fluid level pointer.
(c)Depressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(d)On related hydraulic quantity transmitter, record movement of fluid level pointer.
NOTE : Movement of pointer shows an increase of fluid level in reservoir because of air expansion in system.
(e)If movement of pointer between pressurized and depressurized conditions is more than :
- 2 liters for Green system
- 1.5 liters for Blue system
- 1.5 liters for Yellow system
repeat bleeding procedure until result is satisfactory.
(13)Connect electrical connector (1).

E. Test
(1)Remove warning notices and remove safety clips and tags and close circuit breakers 4GE, 6GL and 7GX.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(3)On ECAM control panel press HYD pushbutton switch.
(4)Using hydraulic ground power cart or Green electric pumps, pressurize Green hydraulic system to approx. 3000 psi (206 bars).
(5)On panel 427VU, press PTU/G/Y pushbutton switch. (ON legend comes on).
(6)On right ECAM display unit, check that Yellow pressure rises towards
R 2800 psi (193 bars).
(7)In hydraulics compartment, check for absence of leaks at connections of replaced PTU.
(8)On panel 427VU, release PTU/G/Y pushbutton switch (ON legend goes off).

F. Close-Up
(1)Top-up Green and Yellow reservoirs if required (Ref. 12-12-29, P. Block 1).
(2)Clean working area. Remove containers and absorbent materials.
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove access platform.

(5)Close main gear doors (Ref. 32-12-11, P. Block 301).
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Green/Yellow Power Transfer Unit
Figure 401

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Caps/Plugs
(2)	Circuit Breaker(s) Safety Clip(s)
(3)	Warning Notices
(4)	Access Platform 2.6 m (8 ft. 8 in.)
(5)	Lockwire
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Fluid Safety Precautions
- 20-23-16, P. Block 1	Installation of O-Ring Seal
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Pressurization/Depressurization of Hydraulic System
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-23-00, P. Block 501	Yellow Auxiliary Power (Power Transfer Unit)
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door Opening)

2. Procedure

A. Job Set-Up
(1)In flight compartment, on HYD PWR section of panel 427VU :
(a)Make certain that electrics pumps are not operating (ELEC PUMPS pushbutton switch legends off).
(b)Display warning notices prohibiting pressurization and use of Yellow and Green hydraulic systems.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	ELEC HYD PUMP	23GX	GEN2/B5
133VU	RSVR QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL &/CARGO DOOR PUMP	7GX	331/T51

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Install access platform at zone 140.

(6)Depressurize Yellow and Green hydraulic systems (Ref. 29-10-00, P. Block 301).
(7)Depressurize Yellow and Green hydraulic reservoirs (Ref. 29-14-00, P. Block 301).

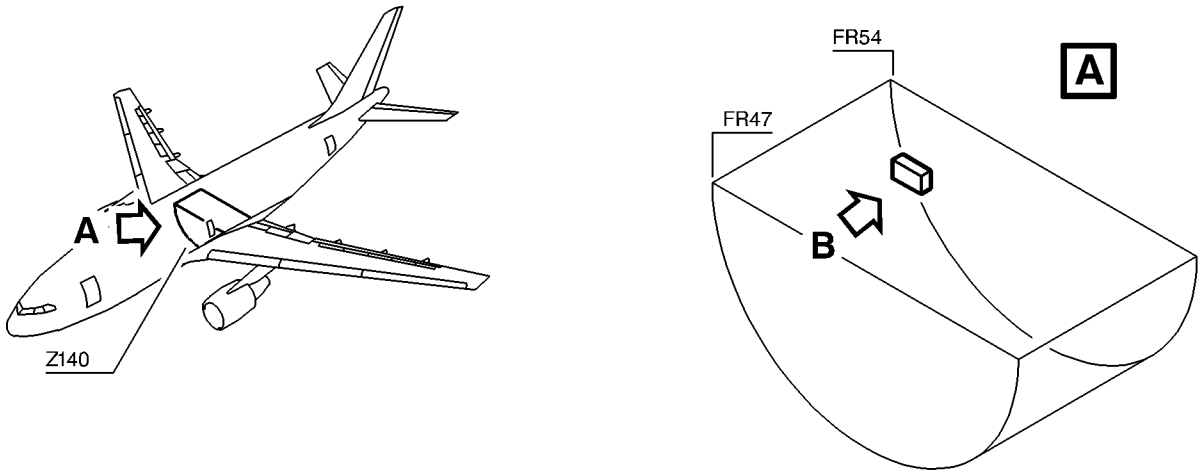
B. Removal
(Ref. Fig. 401)
(1)Remove check valve (1) and discard packing (2) (Ref. 20-23-16, P. Block 1).
(2)Install blanking plug on HP manifold (3) port.

C. Preparation of Replacement Component
(1)Make sure that parts retained from removed component are clean and in correct condition.
(2)Remove blanking plug from HP manifold (3) port.

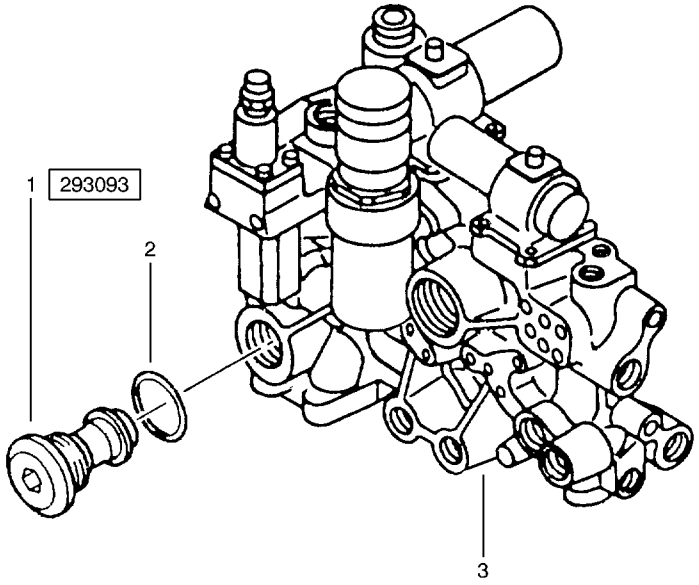
D. Installation
(1)Position new packing (2) on check valve (1) (Ref. 20-23-16, P. Block 1).
(2)Install check valve (1) on HP manifold (3) port, tighten check valve (1) and safety with lockwire.

E. Test
(1)Remove safety clips and tags and close the circuit breakers : 1GQ, 1GR, 1GL, 6GL, 4GE, 7GX and 23GX.
(2)Make certain that fluid level in hydraulic reservoirs is correct : add fluid as necessary (Ref. 12-12-29, P. Block 1).
(3)Perform an operational test of Green/Yellow power transfer unit (Ref. 29-23-00, P. Block 501).
(4)Check for hydraulic fluid leakage at check valve (1) and at HP manifold (3).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove warning notices.
(3)Remove access platform.
(4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



B



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Green/Yellow Power Transfer Unit Delivery
Check Valve
Figure 401

YELLOW AUXILIARY POWER (ELECTRIC PUMP) - DESCRIPTION AND OPERATION

1. Description (Ref. Fig. 002)
   The Yellow system electric pump provides pressure for operation of the forward and aft cargo compartment doors and for the two brake Yellow power accumulators (on the ground and in flight). Fluid is supplied to it from the Yellow system reservoir. A 3 to 15-micron absolute filter is installed on the delivery line.

2. Component Location
R (Ref. Fig. 001)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	293084	FILTER-Y ELEC PUMP DELIVERY		148	734	29-24-12
R	24GX	YELLOW ELEC-PUMP CONTACTOR	107VU	121	121	29-24-27
	25GX	ELEC PUMP-YELLOW		148	734	29-24-11

R 3. Performance

R A. Hydraulic Pump
R - Constant pressure, variable displacement type
R - Nominal pressure : 206 bars at zero delivery
R 196 bars at nominal delivery
R - Nominal delivery : 6 l/mn

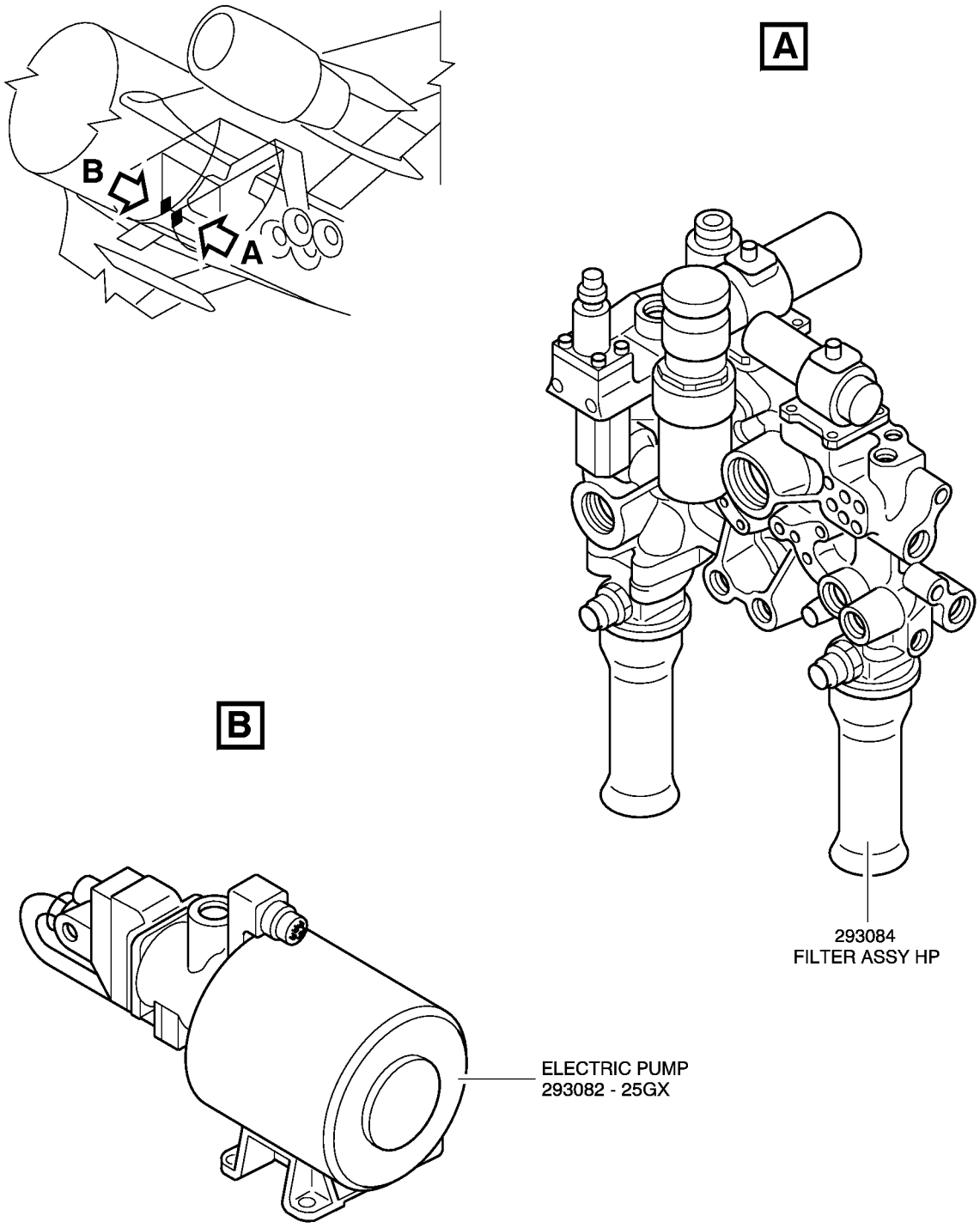
R B. Electric Motor
R - Continuous duty operation
R - Voltage : 3-phase, 400 Hz, 115/200VAC
R - Air cooled.

R 4. Location - Installation
R Rigidly attached to a mount integral with the structure of FR54 in the
R hydraulics compartment. The delivery, suction and case drain lines connected
R to the pump are rigid pipes.

R 5. Control
(Ref. Fig. 003)
The electric pump may be started up by :

A. Placing the control valve manual selector lever located near each cargo compartment door, in **OPEN** or **CLOSE** position.

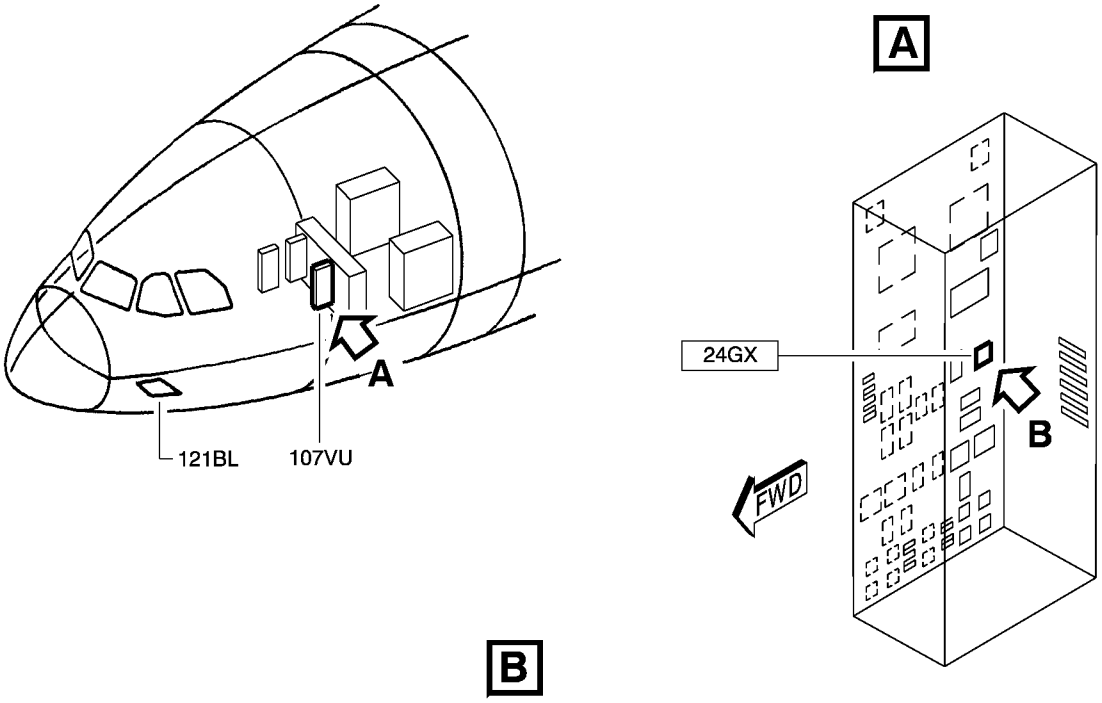
B. Pressing the **PARKING BRAKE ACCU PRESS** pushbutton switch located next to the **PARKING BRAKE** control handle on the center pedestal in the flight compartment. This pressurizes the brake Yellow power accumulators.

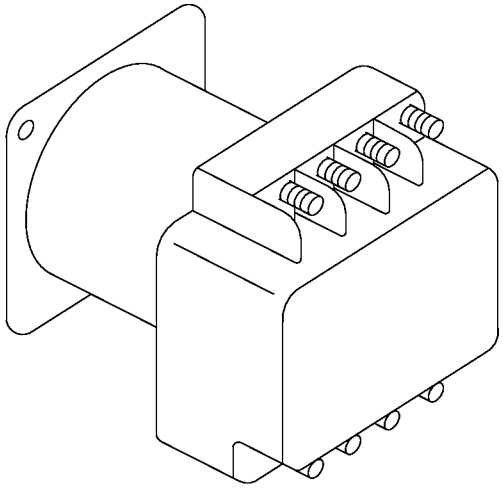


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Component Location (Sheet 1/2)
Figure 001

R

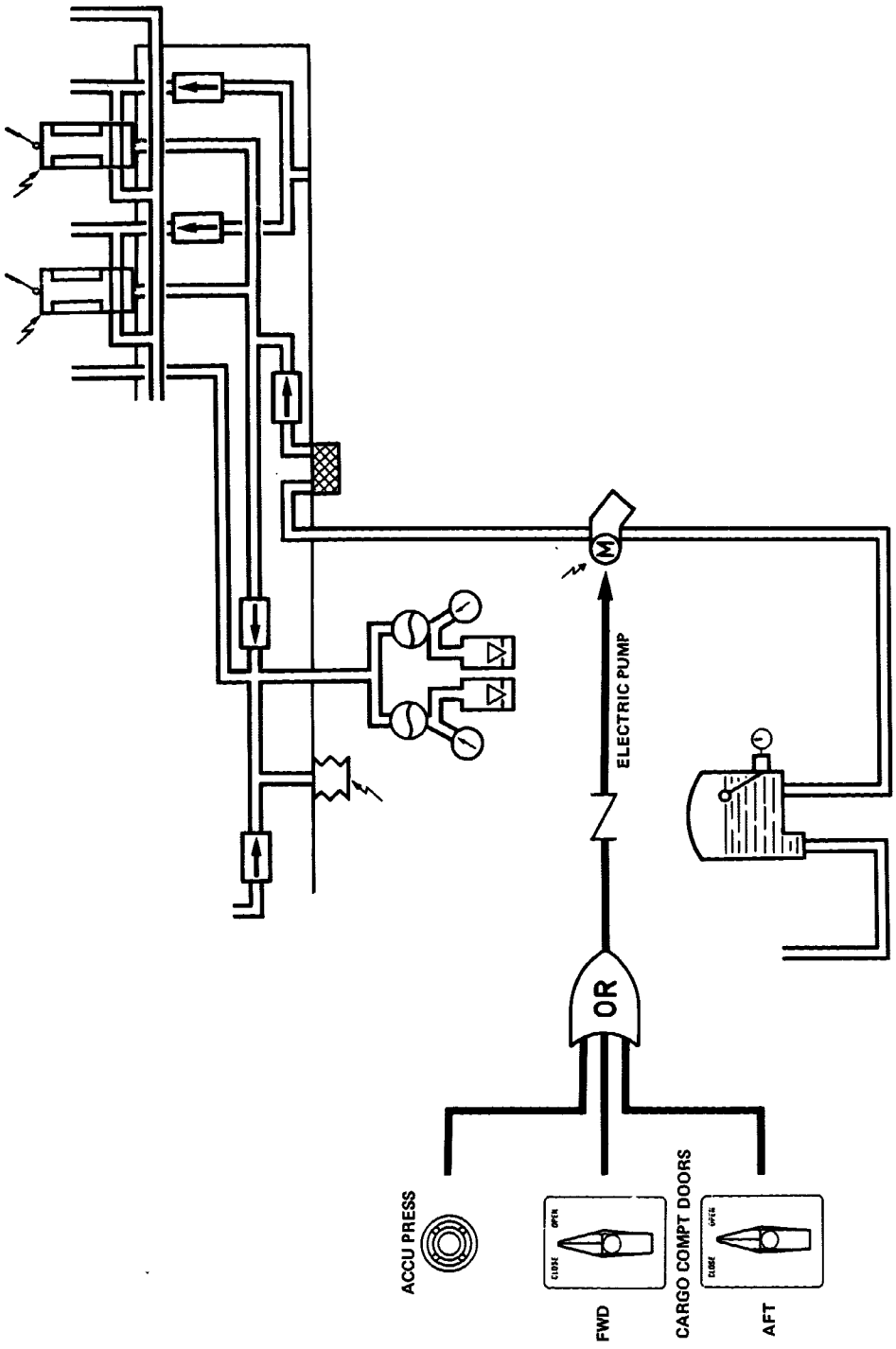




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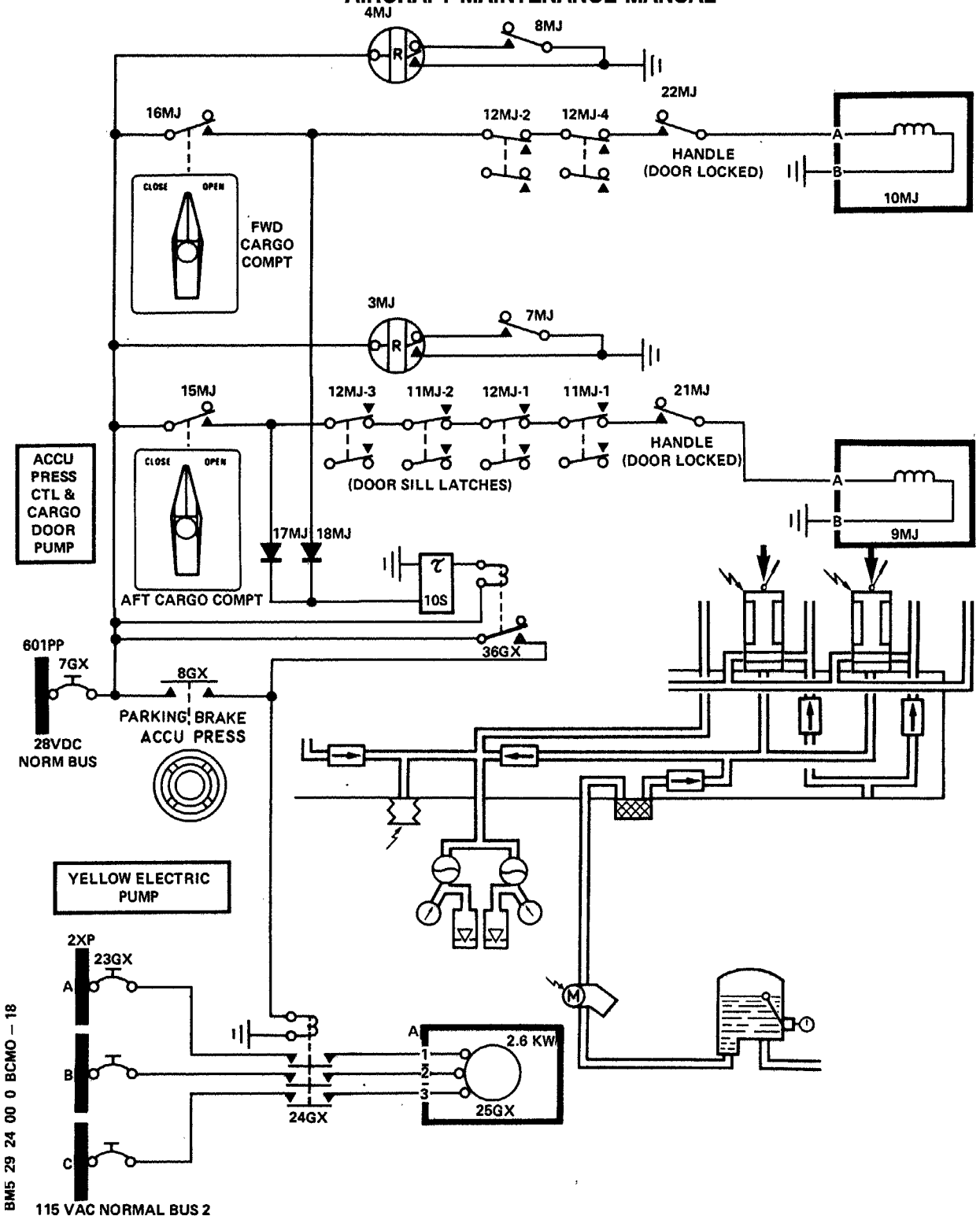
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Component Location (Sheet 2/2)
Figure 001



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Yellow Electric Pump Control
Figure 002



Yellow Auxiliary Power - Electric Pump Control
Figure 003

YELLOW AUXILIARY POWER (ELECTRIC PUMP) - SERVICING

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Yellow System Electric Pump Start Up

A. Reason for the Job
Pressurization of Yellow auxiliary hydraulic system using Yellow system electric pump.

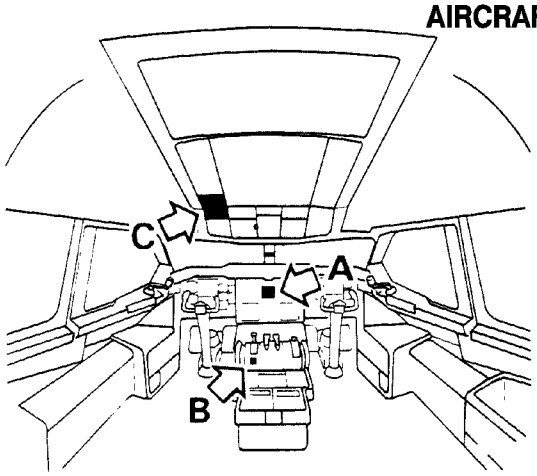
B. Equipment and Materials

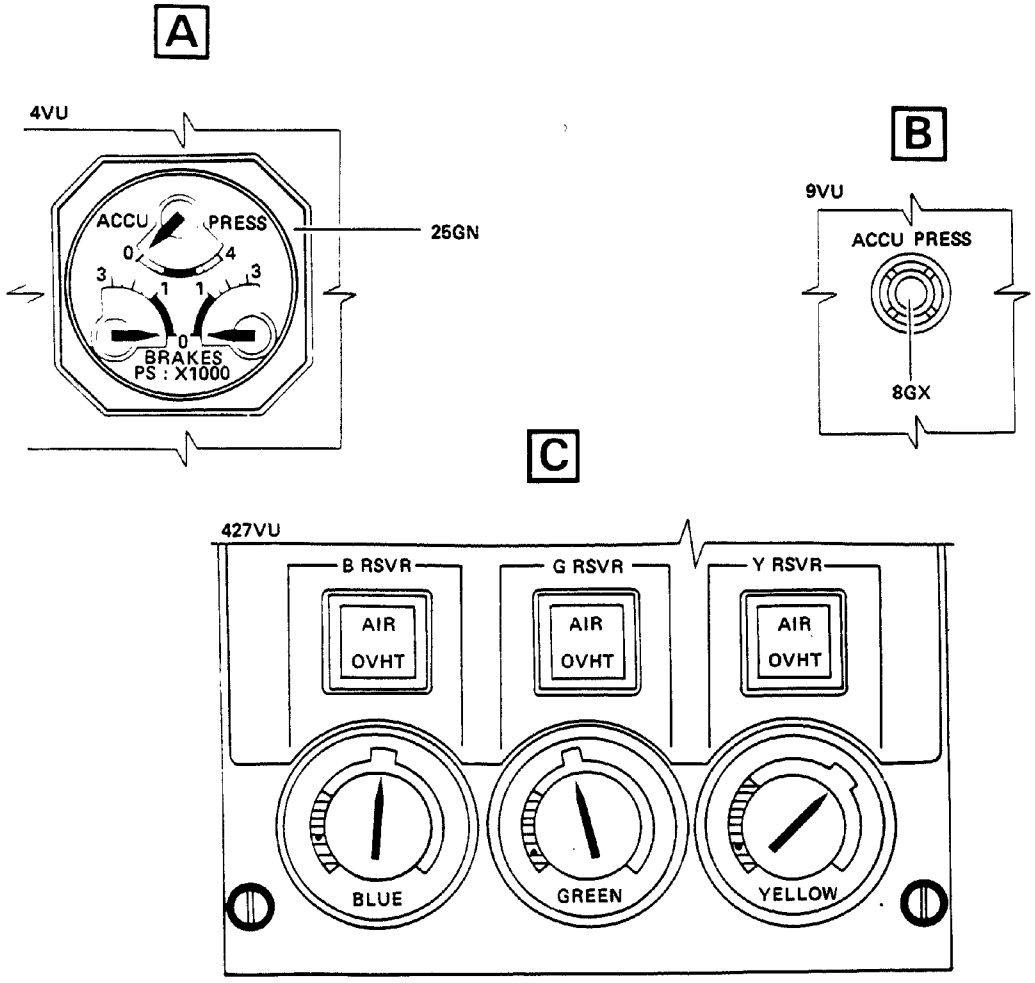
ITEM	DESIGNATION
	Access Platform, 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 52-33-00, P. Block 1	Cargo Compartment Door Hydraulic System
- 12-12-29, P. Block 1	Hydraulics
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

C. Procedure
(Ref. Fig. 301)
(1)Job set-up
(a)Check Yellow hydraulic reservoir fluid level, top up if required. (Ref. 12-12-29, P. Block 1)
(b)Check that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS/CTL & CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
101VU	ELEC/HYD/PUMP	23GX	GEN2/B 8

(c)If cargo compartment doors are open, make certain that safety collars are in position on actuator rods. Display a warning notice prohibiting their operation.
(d)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(e)On HYD PWR panel 427VU
Make certain that AIR legend is off. If not, pressurize





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Yellow System Electric Pump Start-up
Figure 301

hydraulic system reservoirs (Ref. 29-14-00, P. Block 301)

(2)Pressurization

(a)On panel 9VU, press ACCU PRESS pushbutton switch 8GX

(b)On panel 4VU, check that ACCU PRESS indicator reads 3000 PSI (206 bars).

(c)If required, close cargo compartment doors (Ref. 52-33-00, P. Block 1)

NOTE : The system may also be pressurized by means of cargo compartment door control selector valves 15MJ and 16MJ when the doors are opened or closed.

(3)Close-up

(a)Depressurize system if required using pressure relief manual decompression valve 3067.

(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Remove warning notices

(d)Remove all ground handling and maintenance equipment, standard and special tools together will ground power and replenishing equipment, all access equipment and miscellaneous items.

(e)Remove access platform.

YELLOW AUXILIARY POWER (ELECTRIC PUMP) ADJUSTMENT/TEST

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE CERTAIN THAT COMPONENT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
MAKE CERTAIN THAT YELLOW HYDRAULIC RESERVOIR IS PRESSURIZED IN ORDER TO AVOID CAVITATION OF YELLOW ELECTRIC PUMP DURING OPERATION.

1. Operational Test

A. Reason for the Job
Yellow electric pump and associated indicating system test

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Initial conditions
- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation
- Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
101VU	ELEC/HYD/PUMP	23GX	GEN2/B8
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	RSVR/WARN	1GR	333/T58
133VU	YELLOW BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	RSVR/QTY/IND	1GQ	333/T59

- Yellow reservoir OVHT and AIR legends off on panel 427VU.

(b)In flight compartment, on center instrument panel 4VU,
- make certain that landing gear Normal control lever is in DOWN position.

(c)On FWD and AFT cargo compartment doors

- make certain that position of operating handle corresponds to actual position of cargo compartment doors.

(d)In flight compartment, on HYD PWR panel 427VU,

- make certain that aircraft is in the following configuration :

1 PTU pushbutton switches released (out), ON legends off.
2 ELEC PUMPS pushbutton switch released (out), ON legend off.
3 Pointer of Yellow reservoir quantity indicator in the green band.

(2)Tests

ACTION	RESULT
1. On panel 436VU - place ANN LTS switch in TEST position	On panel 427VU - AIR and OVHT legends come on.
2. On panel 436VU - place ANN LTS switch in BRT position	On panel 427VU - above warning lights go off. NOTE : Check that warning lights remain off during final phase of the test.
3. On panel 9VU - operate PARKING BRAKE handle several times. Place it in PARKING position	On panel 4VU - ACCU PRESS indicator indicates a pressure drop.
4. On panel 9VU - Press ACCU PRESS pushbutton switch	On panel 4VU - ACCU PRESS Indicator indicates a rise and stabilizes at 3000 psi (206 bars)
5. Release ACCU PRESS pushbutton switch	On panel 4VU - pressure indication remains at 3000 psi (206 bars) on ACCU PRESS indicator.

R (3)Close-up
R (a)On panel 427VU
R Check that pointer of YELLOW reservoir quantity indicator is in Green
R band.
R (b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R 2. Functional Test

R A. Reason for the Job
R Yellow electric pump test

R B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.6 m (8 ft. 7 in.)
Referenced Procedures	
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 24-41-00, P. Block 301	AC External Power Control

R C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		Line 108
101VU	ELEC/HYD/PUMP	23GX	GEN2/B8
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW BRK/TRIPLE/PRESS/IND	70GG	333/T58
133VU	RSVR/WARN	1GR	333/T60
133VU	RSVR/QTY/IND	1GQ	333/T59

(d)On center instrument panel 4VU :
- make certain that landing gear Normal control lever is in DOWN position.

(e)On FWD and AFT cargo compartment doors
- make certain that position of operating handle corresponds to actual position of cargo compartment doors.

(f)Open a main gear main door (Ref. 32-12-11, P. Block 301).
(g)Depressurize braking accumulator system by operating manual control of pressure relief valve 293067.
Make certain that pressure drops by reading pressure gages 3128 and 3130.
(h)In flight compartment, make certain that aircraft is in the following configuration :
1 On HYD PWR panel 427VU :
- PTU pushbutton switches released (out), ON legends off.
- ELEC PUMPS pushbutton switch released (out), ON legend off.
- Yellow reservoir quantity indicator pointer in the Green band.

2 On HYD PWR panel 427VU :
- Yellow reservoir system OVHT and AIR legends off.

NOTE : These legends will remain off during the following test.

3 On ECAM control panel

- Press HYD pushbutton switch until HYD page appears on right ECAM display unit.

4 On right ECAM display unit
- Yellow pressure displayed is zero.

5 On center instrument panel 4VU
- Pressure displayed on ACCU PRESS indicator is zero.

(2)Tests

ACTION	RESULT
1. On panel 9VU - press ACCU PRESS pushbutton switch	On panel 4VU - pressure read on ACCU PRESS indicator rises and stabilizes at 3000 psi (206 bars).
2. Compare pressure values read on ACCU PRESS indicator on panel 4VU and pressure gages 293128 and 293130 braking accumulator system)	- pressure values must be the same.
R 3. Release pressure by operating manual R control of pressure relief valve 3067 R R	- pressure on ACCU PRESS indicator drops to zero and pressure gages 293128 and 293130 drop to ACCU charging pressure.
4. In zone 132 - operate forward cargo compartment door selector	- In hydraulics compartment - yellow electric pump operates
5. In zone 152 - operate aft cargo compartment door selector	- In hydraulics compartment - yellow electric pump operates.

(3)Close-up

(a)Make certain that filter 293084 clogging indicator is not visible

(b)Check for leakage on suction, delivery and case drain lines of Yellow electric pump.

(c)Close main gear door (Ref. 32-12-11, P. Block 301)

(d)On HYD PWR panel 427VU, check that pointer of Yellow reservoir quantity indicator is in the Green band.

(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

YELLOW AUXILIARY POWER (ELECTRIC PUMP) - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1-29, Item 3 (Yellow System Electric Pump)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 12-14-32, P. Block 1	Landing Gear Inflating and Charging (Brake Accumulator)
- 24-41-00, P. Block 301	A/C External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

B. Procedure
(1)Job set-up
(a)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(b)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
101VU	ELEC/HYD/PUMP	23GX	GEN2/B8

(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)In flight compartment, on panel 427VU, display a warning notice
(e)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	PTU CTL/G/Y	6GL	332/U60

(f)In flight compartment, on panel 4VU, make certain that landing gear control lever (2GA) is in DOWN position. Display a warning notice prohibiting its operation.
(g)Check that Green reservoir (1000) and Yellow reservoir (3000) quantity indications are correct.
(h)Pressurize hydraulic reservoirs if required (Ref. 29-14-00, P. Block 301).
(j)Position access platform.
(k)Depressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(l)Check brake accumulator 3125 and 3126 charging pressure (Ref. 12-14-32, P. Block 1).
(m)In flight compartment, make certain that aircraft is in the following configuration :
1 On HYD PWR panel 427VU
PTU pushbutton switches released (out), ON legends off.
ELEC PUMPS pushbutton switch released (out), ON legend off.
PUMPS ENG1 and 2 pushbutton switches released (out), OFF legends on.
AIR and OVHT legends off.

(2)Tests
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)- On HYD PWR panel 427VU, press ELEC PUMPS pushbutton switch, ON and LO PR legends come on. When pressure exceeds 1750 psi (120 bars), LO PR legend goes off.
- On ECAM control panel, press HYD pushbutton switch. On right display unit, HYD page appears. Green hydraulic system pressure increases to
R 3000 ±150 psi (206 ±10 bars), the electric pump box display
R is in line (green display), the liaison bar above the box comes on
R green.
(c)- On panel 427VU, press PTU G/Y pushbutton switch, ON legend comes on.
- On right ECAM display unit, Yellow hydraulic system pressure increa-
R ses to 2500 psi (172 bars), Green/Yellow PTU indicating triangle and liaison bar come on green.
- On panel 4VU, on triple indicator (71GG), indicated pressure must be
R 2500 psi (172 bars) approx.
- In hydraulics compartment, adjacent to brake accumulators 3125 and
R 3126, on pressure gages 3128 and 3130, indicated pressure is 2500 psi
R (172 bars) approx.
(d)On panel 427VU, release PTU G/Y pushbutton switch, ON legend goes off.
(e)On panel 427VU, release ELEC PUMPS pushbutton switch, ON legend goes off.
(f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove warning notices.
(c)Make certain that circuit breakers 7GX and 23GX are open, safetied and tagged.
(d)Remove all ground handling and maintenance equipment, standard and

special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

(e)In flight compartment, on panel 4VU, install a temporary placard to warn the flight crew that yellow electric pump 25GX is deactivated.

(f)Make an entry in the aircraft technical log.

(g)Remove access platform.

(h)Close main gear main door (Ref. 32-12-11, P. Block 301).

2. Reactivation

A. Refer to TSM 29-24.

B. Remove temporary placard, in flight compartment.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

CAUTION : WHENEVER CARGO COMPARTMENT DOORS REMAIN OPEN DURING MAINTENANCE ON YELLOW HYDRAULIC SYSTEM (DISCONNECTION OF HYDRAULIC LINES OR REPLACEMENT OF HYDRAULIC COMPONENTS), MAKE CERTAIN THAT CARGO COMPARTMENT DOOR ACTUATOR IS FILLED WITH HYDRAULIC FLUID. IF NOT,BLEED ACTUATOR AND PRESSURIZE LINES PRIOR TO CLOSING DOOR (REF. 52-33-00, P. BLOCK 301).

1. Equipment and Materials

	ITEM	DESIGNATION
R	A.	Torque Wrench
	B.	Containers
	C.	Flexible Bleed Hose
	D.	Blanking Plugs/Caps
	E.	Warning Notices
	F. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
	- 52-33-00, P. Block 1	Cargo Compartment Doors
	- 52-33-00, P. Block 301	Cargo Compartment Door Hydraulic System

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Place **PARKING BRAKE** control handle in **NORMAL** position.
(2)Open cargo compartment doors if their opening is required for other maintenance operations in progress on aircraft (Ref. 52-33-00, P. Block 1).
(3)Open main landing gear door (Ref. 32-12-11, P. Block 301).
(4)In flight compartment, on panel 427VU :
- make certain that hydraulic pressurization systems are in the following configuration :
(a)**ELEC PUMPS** pushbutton switch released (out).
(b)**PTU/G/Y** pushbutton switch released (out).

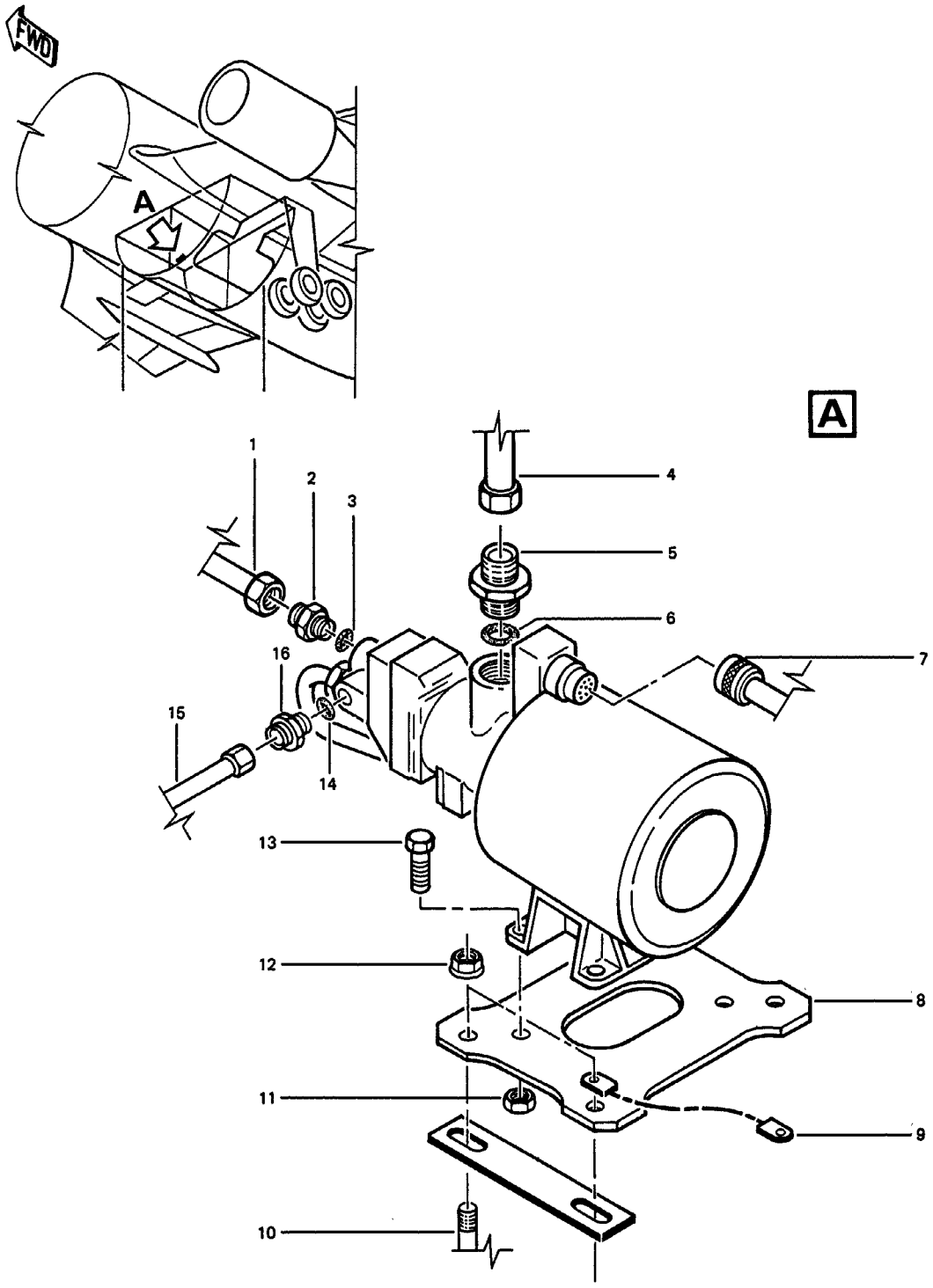
(5)Display warning notices prohibiting use of the Yellow system :
- in flight compartment on panel 427VU
- on Yellow system ground connectors.
- on Yellow hand pump.

(6)Depressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(7)Depressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(8)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
101VU	ELEC/HYD/PUMP	23GX	GEN2/B8

B. Removal
CAUTION : **CHECK THE HYDRAULIC SYSTEM FILTERS IF THE PUMP HAS BEEN REMOVED BECAUSE OF OPERATION WITHOUT FLUID OR BECAUSE OF MALFUNCTIONING AND HENCE POSSIBLE INTERNAL DAMAGE. IF FOREIGN MATTER IS FOUND ON THE FILTERS, THE LINES CONNECTING THE PUMP TO THE FILTERS MUST BE FLUSHED.**
NOTE : Disconnected lines shall be systematically blanked with plugs.
(1)Disconnect electrical connector (7).
(2)Loosen clamp supports of pump lines if necessary.
(3)Position fluid recovery container and absorbant material under pump.
(4)Disconnect delivery line (1).
(5)Disconnect suction line (4) and case drain line (15).
(6)Remove self-locking nuts (12) and discard.
(7)Remove bonding strip (9).
(8)Remove pump.

C. Preparation of Replacement Component
(1)Remove unions (5), (2) and check valve (16) from old pump and install them on replacement pump with new seals (3), (6) and (14).
(2)Remove and retain the four bolts (13), nuts (11) and plate (8).
(3)Install plate (8) on new pump using retained bolts and nuts.



BM5 29 24 11 4 AAMO

Electric Pump
Figure 401

D. Installation

CAUTION : WHENEVER CARGO COMPARTMENT DOORS REMAIN OPEN DURING MAINTENANCE ON YELLOW HYDRAULIC SYSTEM (DISCONNECTION OF HYDRAULIC LINES OR REPLACEMENT OF HYDRAULIC COMPONENTS), MAKE CERTAIN THAT CARGO COMPARTMENT DOOR ACTUATOR IS FILLED WITH HYDRAULIC FLUID. IF NOT, BLEED ACTUATOR AND PRESSURIZE LINES PRIOR TO CLOSING (REF. 52-33-00, P. BLOCK 301).

(1)Position pump on threaded rods (10).
(2)Remove blanking cap from suction line (4) and connect line to pump.
(3)Remove blanking cap from delivery line (1) and connect line to pump.
(4)Tighten union nuts of lines (1) and (4).
(5)Install flexible bleed hose on pump case drain port.
(6)Pressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(7)Bleed pump. Remove flexible bleed hose. Connect case drain line (15).
(8)Perform following steps to make certain that there is no air in hydraulic system :
(a)Make certain that air pressure in Yellow hydraulic reservoir is not less than 3.5 bars (50 psi). If necessary, pressurize reservoir (Ref. 29-14-00, P. Block 301).
(b)On Yellow reservoir hydraulic quantity transmitter, record position of fluid level pointer.
(c)Depressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(d)On Yellow hydraulic quantity transmitter, record movement of fluid level pointer.

NOTE : Movement of pointer shows an increase of fluid level in reservoir because of air expansion in system.

(e)If movement of pointer between pressurized and depressurized conditions is more than 1.5 liters for Yellow system, repeat bleeding procedure until result is satisfactory.
(9)Install bonding strip (9).
(10)Install and tighten new self-locking nuts (12).
(11)Tighten clamp supports of pump lines if these were loosened.
(12)Connect electrical connector (7).

E. Test

(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Top-up Yellow hydraulic reservoir as required (Ref. 12-12-29, P. Block 1).
(c)Remove safety clips and tags and close circuit breakers 7GX and 23GX.
(d)Make certain that the following circuit breaker is closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60

(e)In flight compartment, on center pedestal, press PARKING BRAKE ACCU

PRESS pushbutton switch. On YELLOW ACCU PRESS indicator, check that reading is within green band.

(2)Check

(a)Check for absence of leaks at pump port unions.

(3)Release PARKING BRAKE ACCU PRESS pushbutton switch.

F. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close main landing gear door (Ref. 32-12-11, P. Block 301).

(3)Close cargo compartment doors (Ref. 52-33-00, P. Block 1).

(4)Remove warning notices.

(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

ELECTRIC PUMP DELIVERY FILTER 293084 - SERVICING

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Reason for the Job

A. Replacement of Filter Element

2. Equipment and Materials

ITEM	DESIGNATION
A.	Compressed AIR Cylinder
B.	Access Platform, 2.60 m (8 ft. 8 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-24-00, P. Block 301	Yellow AUXILIARY Power (electric pump)
- 32-12-11, P. Block 301	Main Gear Main Door - Servicing (Ground Door(s) Opening

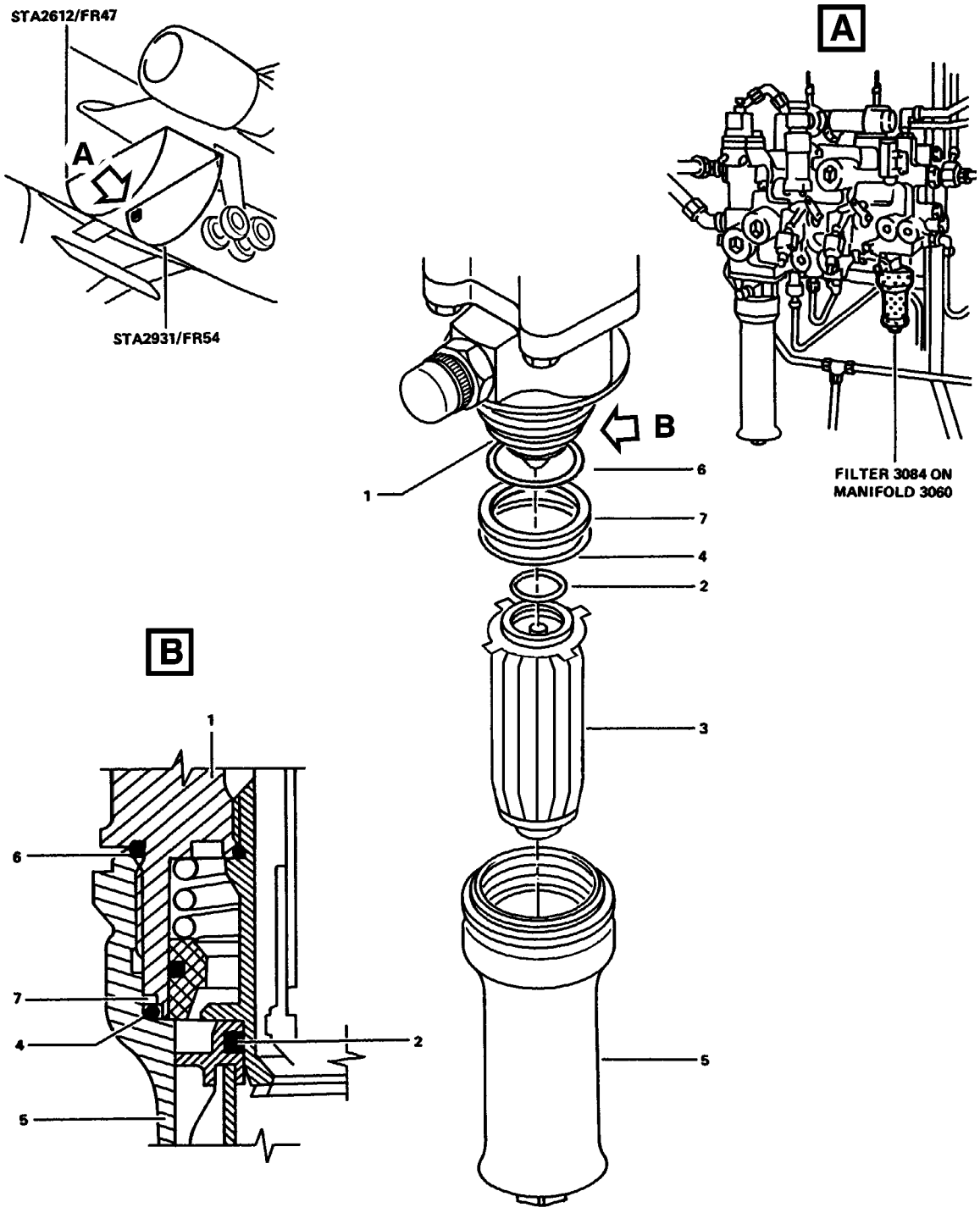
3. Procedure

(Ref. Fig. 301)

R A. Job set-up
R (1)On mechanical center pedestal 9VU display a warning notice prohibiting
R operation of Yellow electric pump 25GX.
R (2)In zones 132 and 152, display a warning notice on cargo compartment
R door selector valves prohibiting opening or closing of doors
R (3)Open right main gear main door (Ref. 32-12-11, P. Block 301)
R (4)Install access platform at zone 148.
R (5)Open access door 671DB to Yellow system ground connectors.
R (6)Open, safety and tag the following circuit breaker

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(7)Release pressure in Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(8)Depressurize Yellow hydraulic system reservoir (Ref. 29-14-00, P. Block 301).



BM5 29 24 12 3 AAM0 14

Filter 293084 - Replacement of Element
Figure 301

R

B. Removal
(1)Cut and remove lockwire between filter head (1) and bowl (5)
(2)Unscrew bowl (5)
(3)Discard O-ring (6) from filter head (1).
(4)Discard O-ring (4) and remove back-up ring (7)
(5)Remove filter element (3) from bowl (5). Discard O-ring (2)
NOTE : If filter element (3) is re-usable and if it cannot be cleaned immediately after removal, immerse it in hydraulic fluid after having blanked its outlet port.
Make certain that back-up ring (7) is in correct condition.

C. Installation
CAUTION : INSTALL NEW OR RECONDITIONED FILTER ELEMENT.
FOR A RE-USABLE FILTER ELEMENT, CLEANING MUST BE PERFORMED IN AN ULTRASONIC TANK AND BE FOLLOWED BY A PERFORMANCE TEST. BEFORE INSTALLATION, NEW O-RINGS MUST BE COATED WITH HYDRAULIC FLUID.
(1)Install new O-ring (4) and back-up ring (7) on bowl (5).
(2)Install new O-ring (2) on filter element (3).
(3)Install filter element (3) in bowl (5), previously cleaned then dried off with clean and dry compressed air.
(4)Install new O-ring (6) on filter head (1).
(5)Position bowl/filter element assembly under filter head (1)
(6)Tighten bowl (5) home. MAXIMUM TORQUE : 4 m.daN (30 lbf.ft.).
(7)Wirelock bowl (5)
(8)Press clogging indicator if protruding

D. Tests
(1)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301)
(2)Remove safety clip and tag and close circuit breaker 7GX
(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.
(4)Pressurize Yellow electric pump system (Ref. 29-24-00, P. Block 301).
(5)Check filter for leakage.
(6)Check hydraulic fluid level in Yellow system reservoir and top up if necessary (Ref. 12-12-29, P. Block 1).

R E. Close-up
R (1)Close access door 671DB
R (2)Remove all ground handling and maintenance equipment, standard
R and special tools together with replenishing equipment, all access
R equipment and miscellaneous items.
R (3)Close right main gear main door (Ref. 32-12-11, P. Block 301).
R (4)De-energize the aircraft electrical network (Ref. 24-41-00,
R P. Block 301).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Torque Wrench
Referenced Procedures	
- 24-23-00, P. Block 301	Auxiliary AC generation
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure

R (Ref. Fig. 401)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS CTL & CARGO DOOR PUMP	7GX	333/T51
101VU	ELEC HYD PUMP	23GX	GEN2/B05

(2)Make sure that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.

NOTE : This is to avoid 115 Volt on contactors which are upstream EXT PWR line contactor.

(3)Open access door 121BL.

(4)In flight compartment, on ELEC PWR panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting operation of BAT1, 2, 3, APU GEN and BAT OVRD pushbutton switches.

(5)In flight compartment, on APU section of ENG START panel 429VU, install warning notice prohibiting operation of APU.

(6)In avionics compartment, remove front panel from relay box 107VU.

B. Removal

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MARK ALL ELECTRICAL CONNECTIONS FOR RELOCATION PURPOSES.

(1)Remove nuts (2) and remove power connections (3).

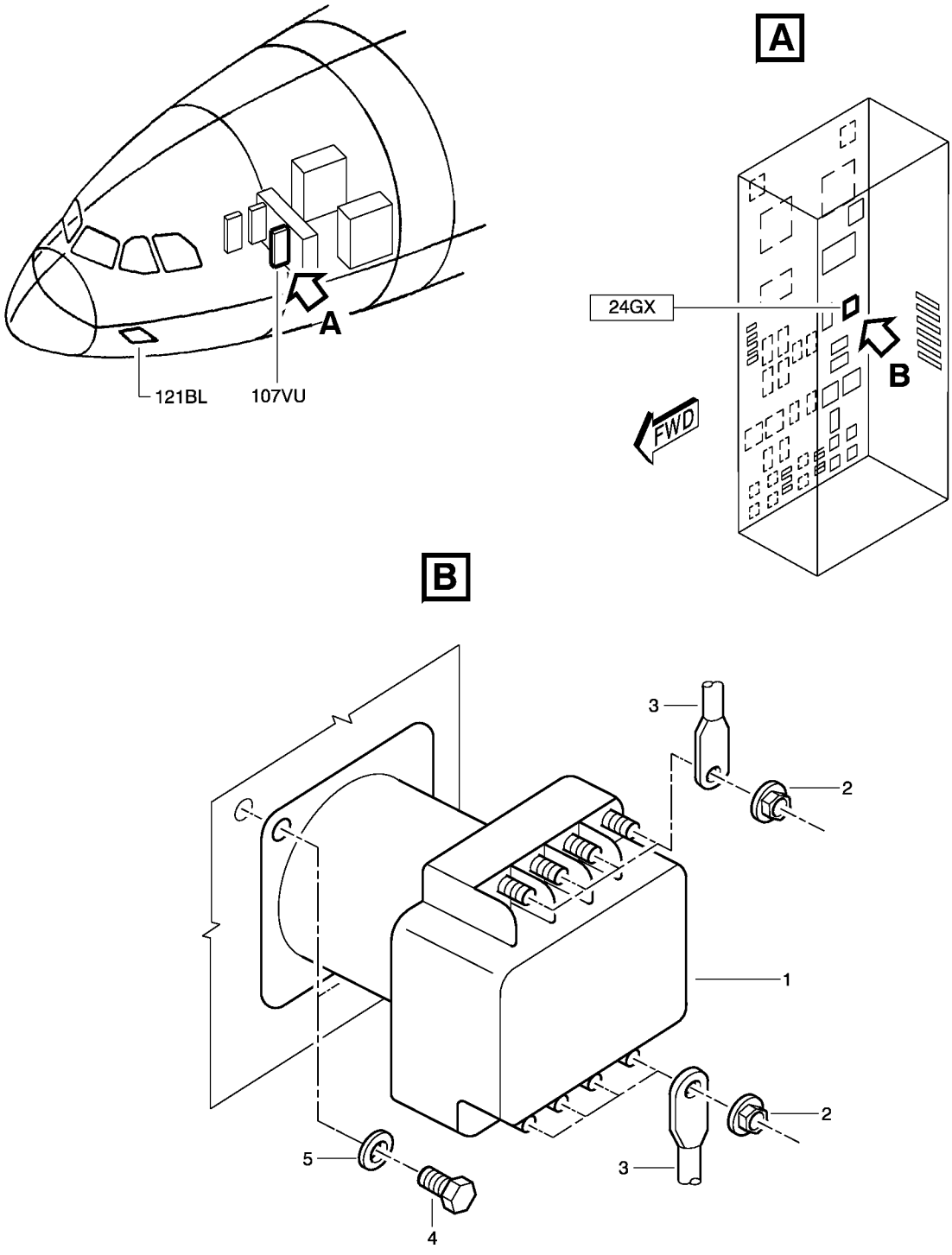
(2)Remove the two screws (4) and washers (5).

(3)Remove contactor (1).

C. Installation

CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

(1)Position contactor (1), tighten with the two screws (4) and washers (5).



Yellow Electric Pump Contactor (24GX)
Figure 401

(2)Secure power connections (3) with nuts (2).
(3)Tighten nuts (2).
(4)Not applicable.
(5)Remove the safety tags and close the circuit breakers 7GX and 23GX.

D. Test
(1)Make sure the aircraft electrical network is correctly supplied by external power (Ref. 24-41-00, P. Block 301) or by APU generator (Ref. 24-23-00, P. Block 301).

E. Close-Up
(1)Install front panel on relay box 107VU.
(2)Close access door 121BL.
(3)In flight compartment, on ELEC PWR panel 424VU and APU section of ENG START panel 429VU, remove warning notices.
(4)Remove warning notice prohibiting use of external power receptacle from door 121EL.

YELLOW AUXILIARY POWER (RAM AIR TURBINE) - DESCRIPTION AND OPERATION

1. Description

(Ref. Fig. 001)
(Ref. Fig. 002)

A. The ram air turbine (RAT) is used in the event of failure of both engines, to supply emergency hydraulic power to the primary flight controls.
It is composed of :
- A hinged support strut
- A two-bladed turbine
- A variable displacement hydraulic pump
- A linkage connecting the assembly to the doors.
- An uplock mechanism
- An ejection jack
- A ground checkout module

The ram air turbine is normally retracted and held in this position by an uplock mechanism.
Ejection is initiated by mechanical release of the uplock mechanism, and is continued by a mechanical ejection jack. Stowage of the RAT in its compartment is achieved manually on the ground.

B. Function of the Various Components

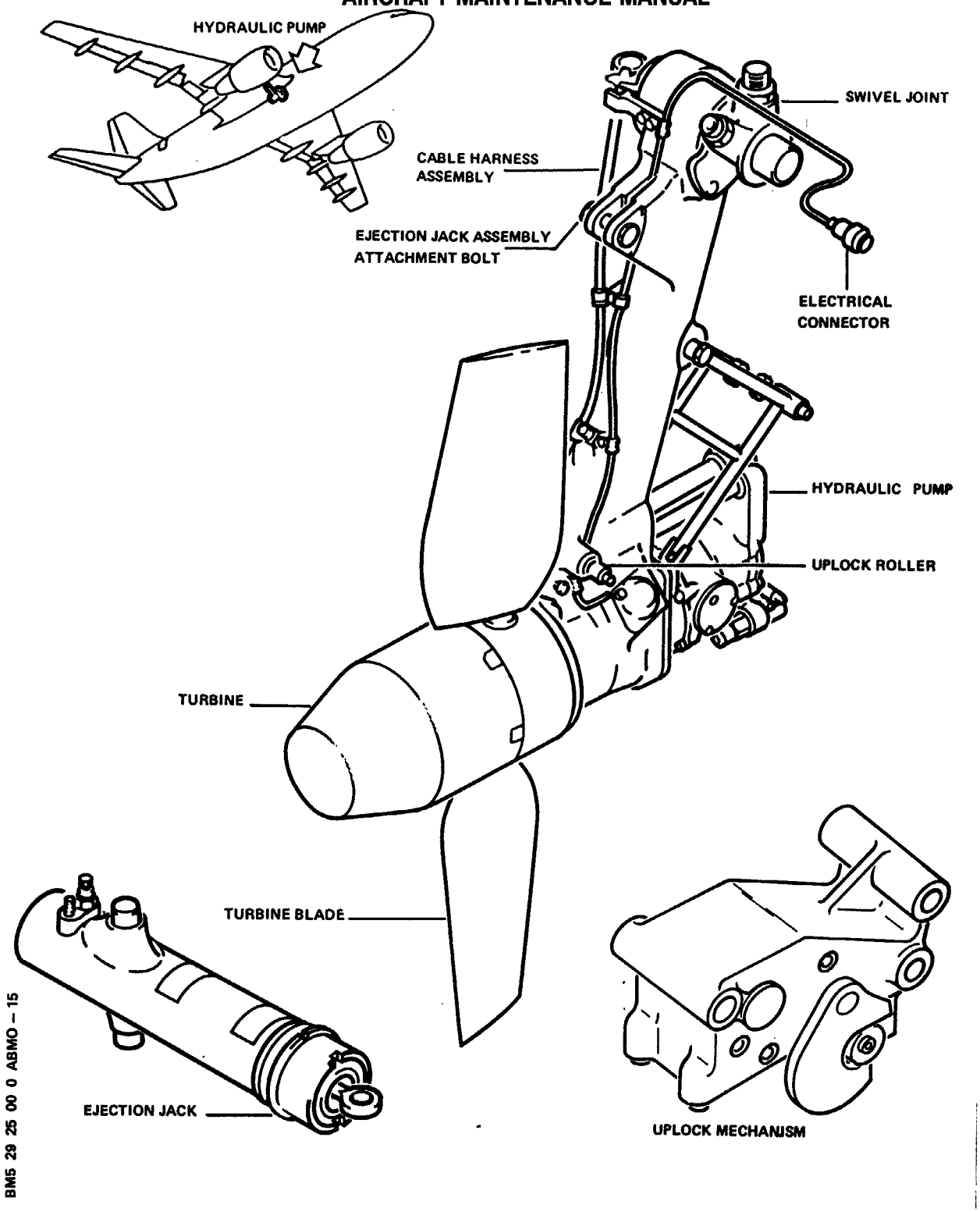
(1)Strut
The strut receives :
(a)The turbine
(b)The pump
(c)The pivot post with associated hydraulic swivel coupling.
(d)The ejection jack piston rod eye-end
(e)The plunger locking the rotating section when the RAT is not fully extended
(f)The turbine/hydraulic pump drive shaft
(g)The uplock roller
(h)The linkage connecting the RAT to the door opening mechanism.

(2)Turbine assembly
The turbine :
- Receives the two blades, tip-to-tip diameter of which is 27 in.
- Houses the blade pitch governor (Ref. detail, Para.5 hereinafter)

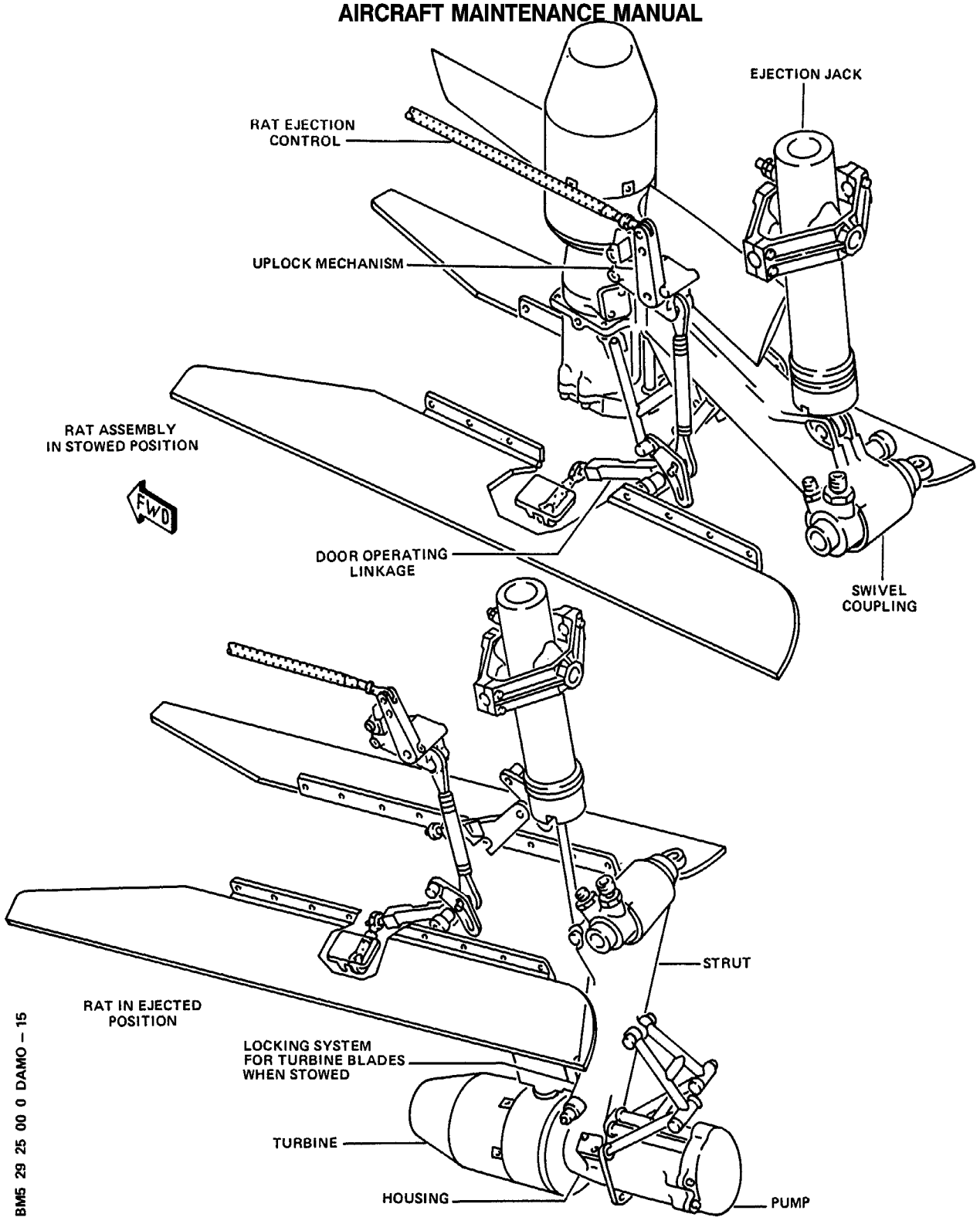
(3)Hydraulic pump
The pump is used in normal operation to provide hydraulic power. It is also used on the ground as a motor to drive the turbine for governing system checkout.

(4)Linkage connecting the strut to the door opening mechanism.
The connecting linkage is an integral part of the ram air turbine assembly, and accompanies the doors as they open at the start of RAT ejection, until they automatically downlock when fully open.
NOTE : The spring on each half door eliminates the risk of interference between RAT blade and structural doors.

(5)Uplock mechanism
The uplock holds RAT in stowed position until RAT is deployed. RAT deployment is initiated from flight compartment. Rotation of uplock input



Ram Air Turbine
Figure 001



Ram Air Turbine
Figure 002

shaft moves an internal locking cam that unlocks the uplock hook. Release of this uplock hook allows ejection jack to push RAT out into the airstream.

(6) Ejection jack

The ejection jack consists of an oil dampened, spring powered actuator that extends RAT into the airstream. Helical compression springs initiate RAT deployment against compartment doors. Once caught by the airstream, the RAT is forced to the fully deployed position. As RAT approaches the fully deployed position, oil is forced through various sized internal orifices causing a dampening effect. The dampening effect prevents high shock loads from being transmitted into the RAT and into the aircraft structure.

R (7) Ground checkout module

The aircraft mounted ground checkout module is used to operationally check RAT while aircraft is on the ground. The ground checkout module consists of a solenoid-operated spool valve assembly, a pressure switch, a volumetric fuse cartridge valve, and two check valves.

The solenoid operated spool valve assembly is spring-loaded to the normal position. In this position, hydraulic fluid from the aircraft hydraulic system will flow to the RAT. When spool valve assembly is activated to the SPIN (backdrive) position, it causes the high and low pressure hydraulic fluid flow to be reversed so that the hydraulic pump can be used as a motor to drive the RAT.

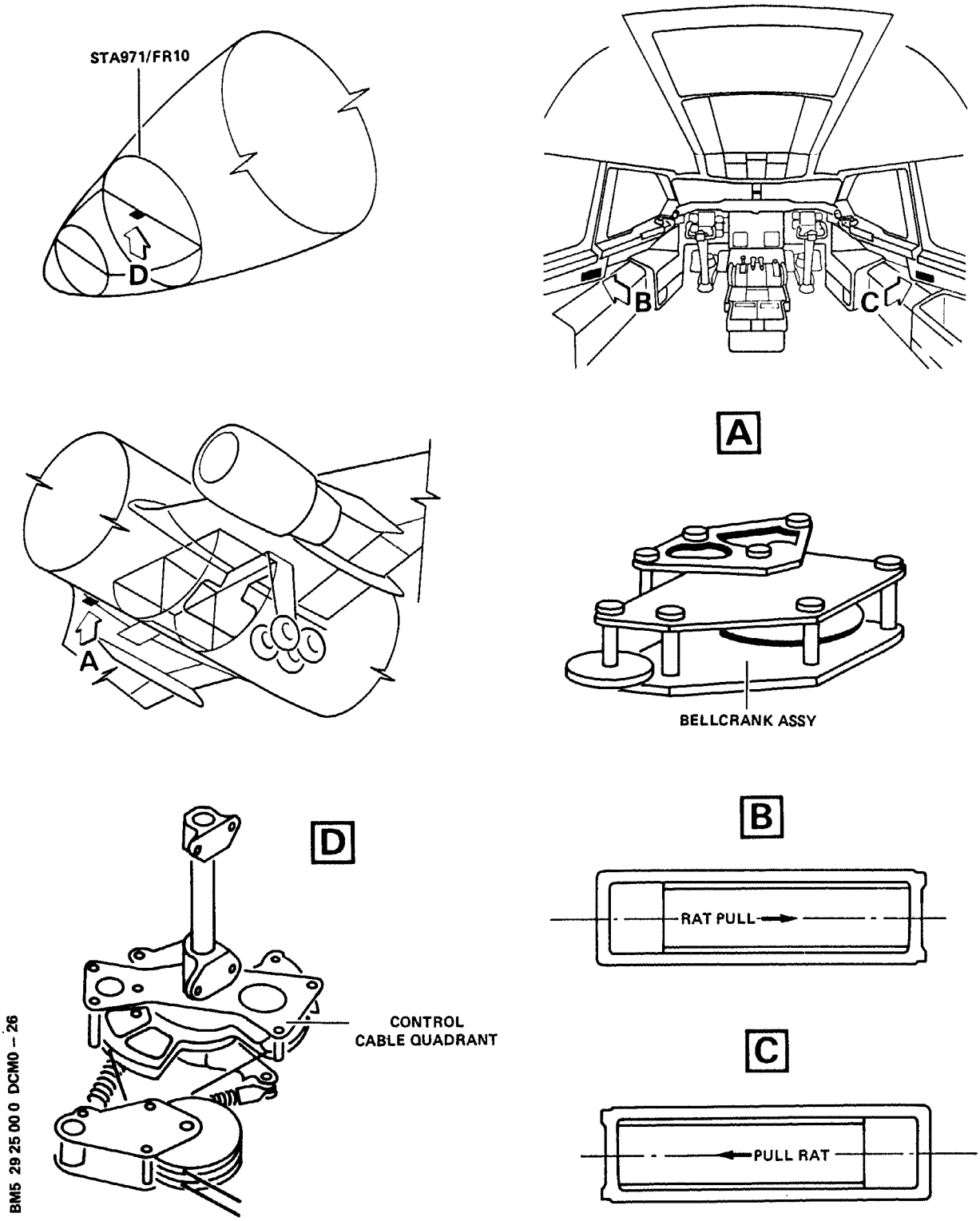
The pressure switch signals an aircraft indicator when RAT is delivering 2,250 psi pressure to the aircraft hydraulic system. This pressure switch signal also indicates that RAT and ground checkout module have returned to their normal operating mode after a ground functional test

The volumetric fuse cartridge valve is used to off-load RAT until RAT reaches its governed speed.

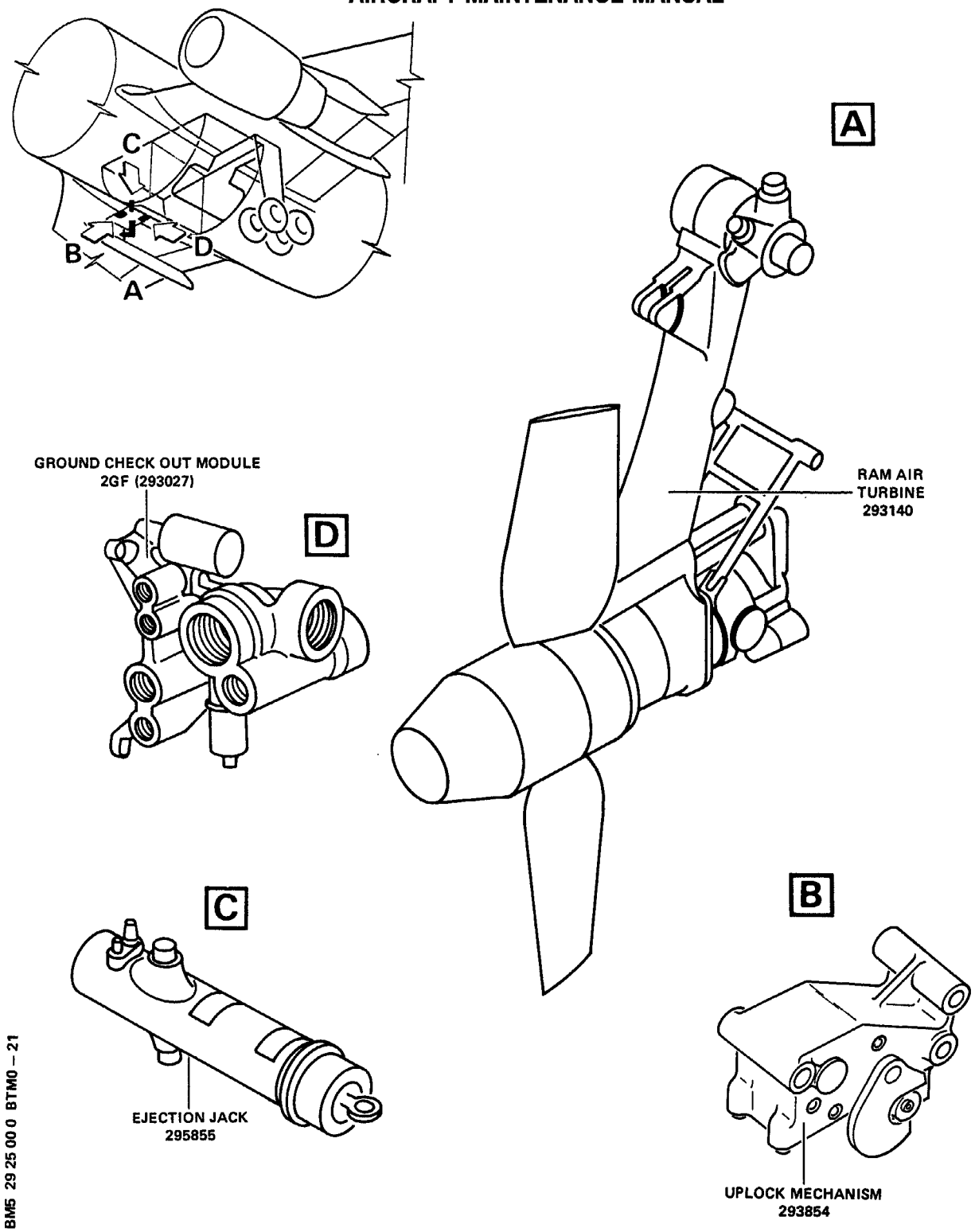
Two check valves in the ground checkout module are located in RAT pressure line. These check valves prevent RAT system from being pressurized by aircraft hydraulic high pressure when RAT is stowed. The check valve in supply line prevents reverse flow in that line while the check valve in return line prevents a "hydraulic short circuit" during RAT start up.

2. Component Localisation
(Ref. Fig. 003)
(Ref. Fig. 004)
(Ref. Fig. 005)

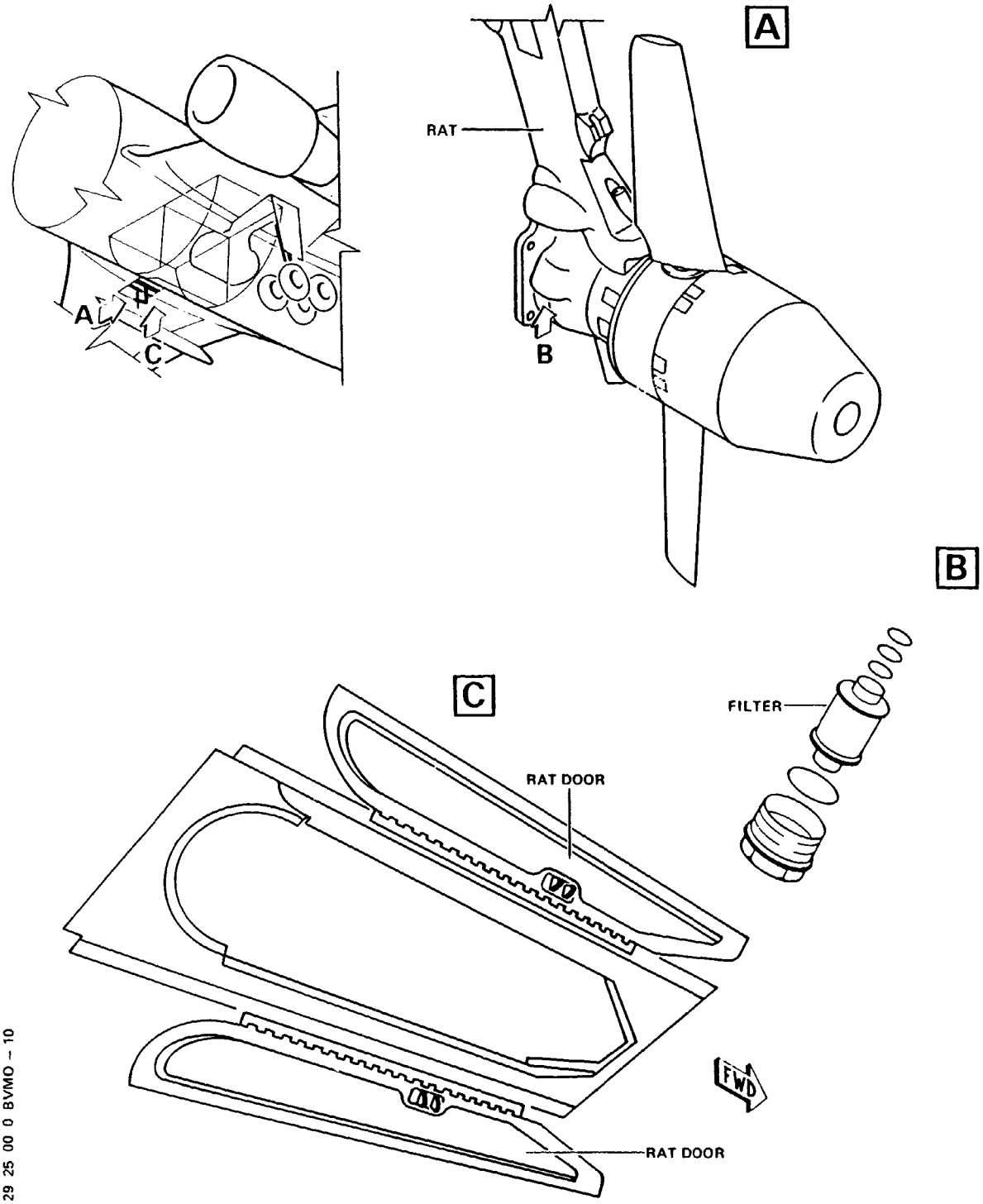
	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	293097	CONTROL HANDLE-RAT		211 221		29-25-13
	293140	RAM AIR TURBINE		671	671EB	29-25-27
		RAM AIR TURBINE ASSEMBLY		671	671EB	29-25-37
	295854	UPLOCK MECHANISM		671	671EB 671FB	29-25-26
	295855	JACK-RAT EJECTION		671	671EB 671FB	29-25-33
R	2GF	MODULE-RAT GROUNDCHECK OUT		671	671BB	29-25-29
		CONTROL CABLE QUADRANT-RAT		211	121BL	29-25-16
R		BELLCRANK ASSY-FUSLG-TO-WING		671	671BB	29-25-22
		RAT CTL FEEDTHROUGH FILTER		671	671EB 671FB	29-25-35
		DOORS-RAM AIR TURBINE		671		29-25-34



Component Location
Figure 003



Component Location
Figure 004



Component Location
Figure 005

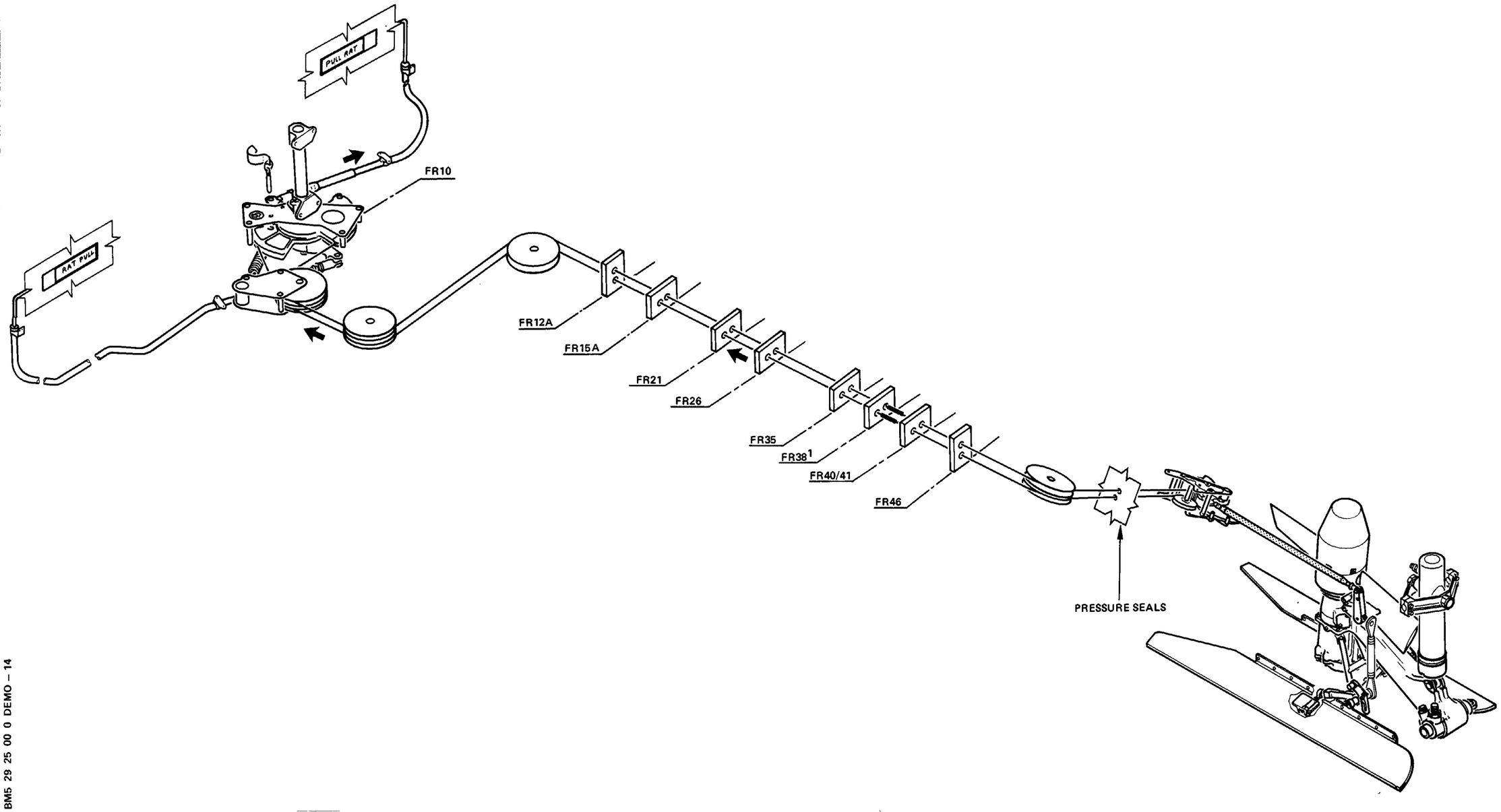
3. Performance
The RAT may be ejected throughout the whole flight envelope, normal and peripheral.
The constant pressure, variable displacement hydraulic pump can supply throughout the above envelope, 206 +3, -0 bars at zero delivery, and > 193 bars at full delivery : 45 l/mn.
The above delivery/pressure performance is met for the following limit configurations of the aircraft :
- Airspeed of 360 kts with a ± 2° skid angle
- Airspeed of 130 kts with a ± 5° skid angle.
Response time (time between the uplock release manual command and the appearance of nominal pressure in the pump delivery line) is less than 6.5 s.

4. Location - Installation
The ram air turbine and associated components are located in the root of the R wing (in the triangle formed by the fuselage, wing spar box rear spar, and the landing gear leg when retracted).

5. Control

A. Ejection
Ram air turbine ejection is controlled by a handle at the Captain's station or a second handle at the First Officer's station. Each handle drives a control system connected to the uplock mechanism release system.
Mechanical control linkage cable diameter is 0.125 in. (3.175 mm).
(Ref. Fig. 006)

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RAT Control System
Figure 006

B. Stowage

The RAT is stowed manually in its compartment as follows :

CAUTION : MAKE CERTAIN THAT THE BLADES ARE AGAINST THE COARSE PITCH STOP BEFORE RAISING THE RAT.

CAUTION : MAKE CERTAIN THAT THE BLADE LOCK PIN WILL ENGAGE THE SLOT IN THE REAR OF THE TURBINE BEFORE RETARACTIN RAT. WHEN THE BLADE LOCK PIN IS PROPERLY ENGAGED, THE TURBINE WILL NOT ROTATE.

CAUTION : DO NOT GRASP THE RAT BY TURBINE ASSEMBLY COVER OR TURBINE BLADES BLADES WHEN MANUALLY RAISING THE RAT.

NOTE : Make certain that uplock hook is open and release lever is fully retracted to allow uplock assembly to latch.

(1)Return RAT control handle into its housing

(2)Check for proper alignment of turbine/pump marks to ensure turbine locking at the beginning of the RAT retraction (5°)

(3)Retract both door locking pins located on RAT fork, and rotate clockwise to lock in place.

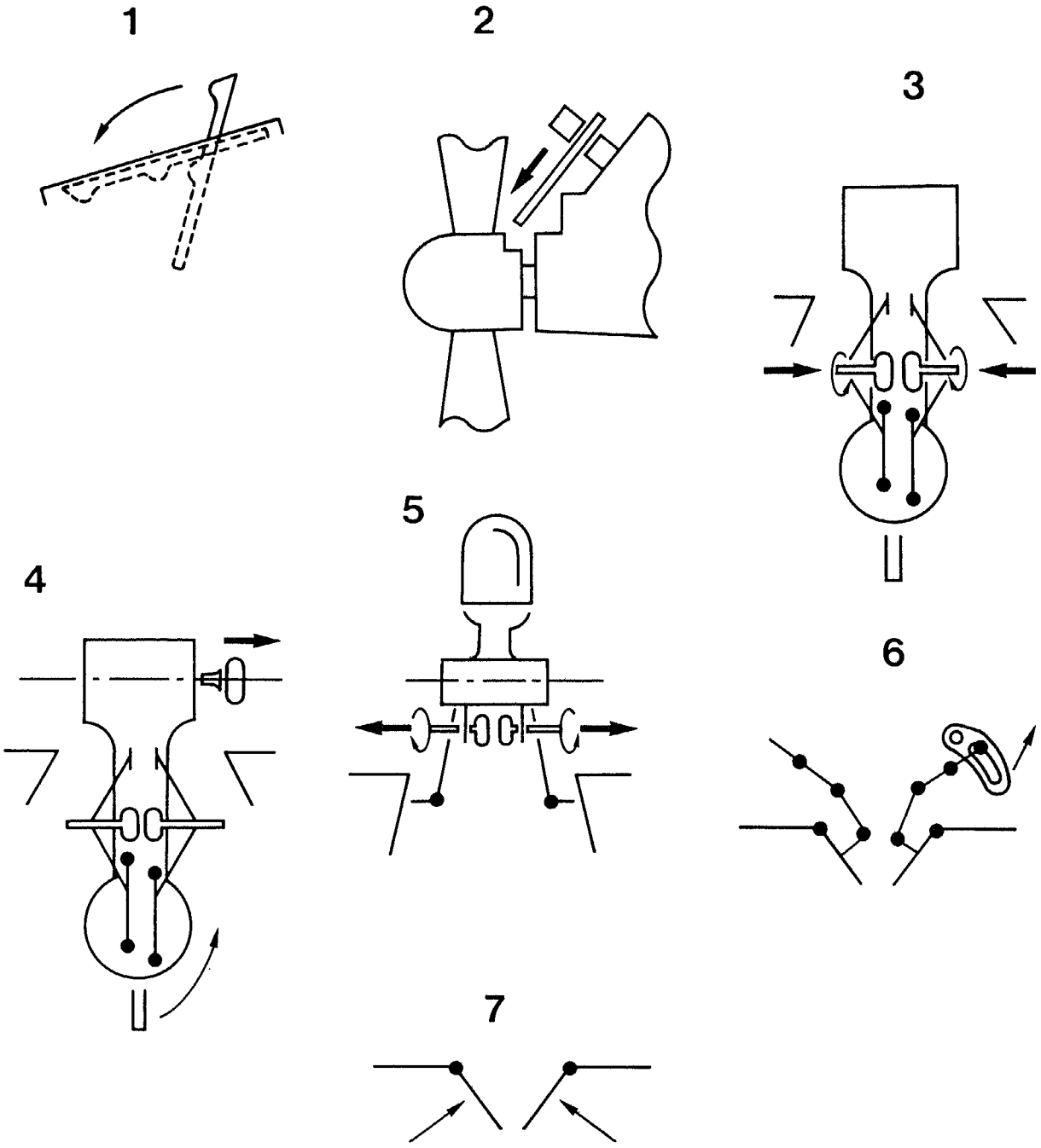
(4)Release the "RAT extended" locking pin (adjacent to RAT hinge pin) and manually raise RAT (2 operators are required or one operator with adequate fixture). Apply force to rear section of pump and not to spinner blades. Automatic locking is achieved at end of travel.

(5)Release both door locking pins

(6)Release pins securing doors in open position

(7)Close doors.

(Ref. Fig. 007)



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Retraction Procedures
Figure 007

6. Governor (Ref. Fig. 008, 009)
The speed of the Ram Air Turbine/Hydraulic Pump is controlled by a blade counterweight and spring type mechanical governor which operates to adjust the pitch of the blades (Ref. Fig. 008) (A).

Incorporated into the control mechanism are coarse pitch stowing weights (W1). These weights when stationary lease the spring load on the governor counter weights and under the action of spring S1 rotate the blades to coarse pitch. This coarse pitch stowage feature insures that a dangerous overspeed will not occur in the event that the blades freeze during prolonged stowage or the governor springs (S2) fail.

As the RAT starts and reaches 15 to 25% of rated speed the coarse pitch stowing weights (W1) are thrown out to their maximum radius and centrifugal force holds them against a stop.

In this position the coarse pitch stowing spring (S1) is compressed. The springs (S2) are in their operating mode with the blades in fine pitch.

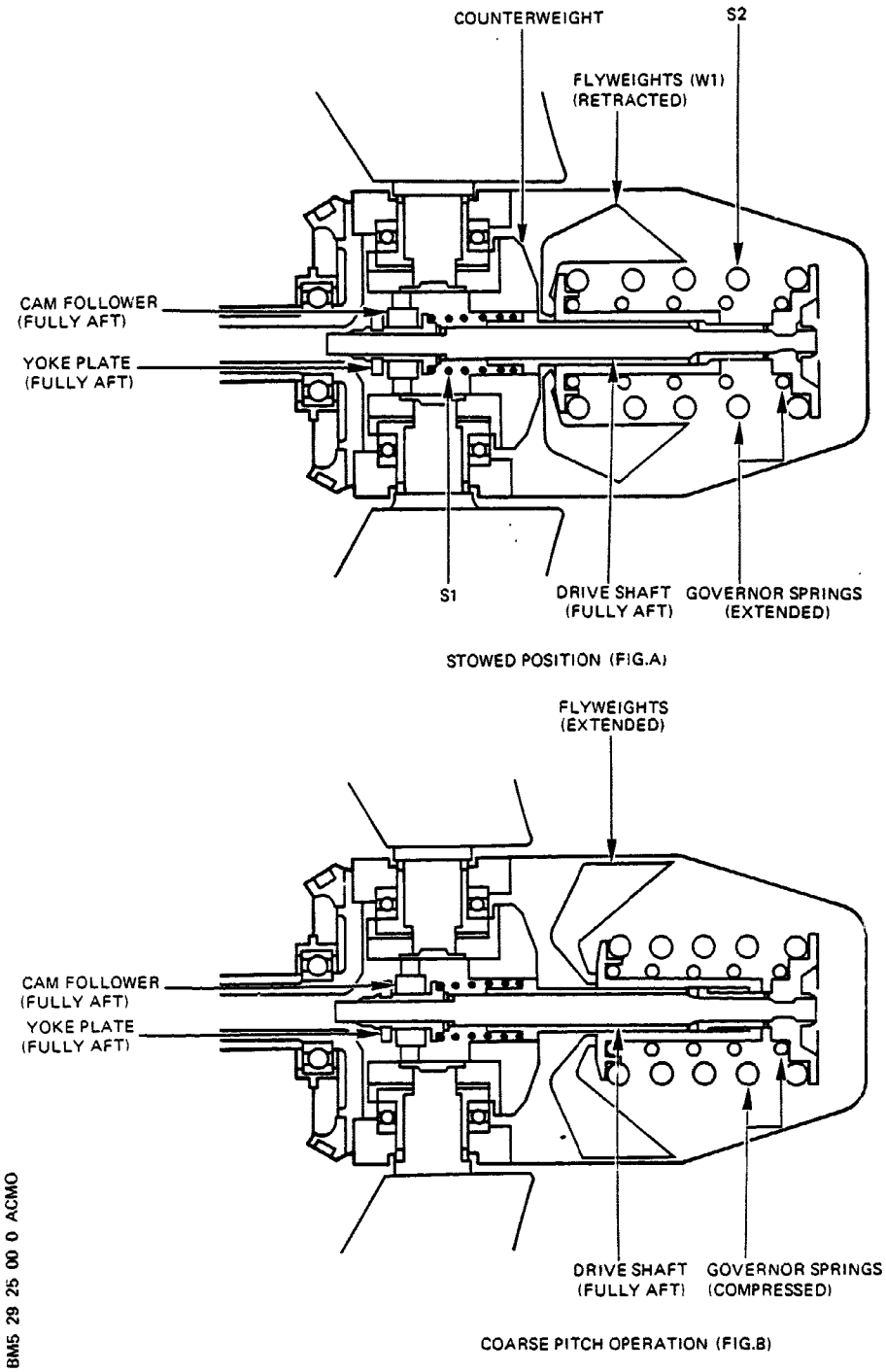
As the speed increases the counterweight twisting moment increases, compressing the governor springs (S2) and adjusting the blades to a coarser pitch to limit the speed.

Constant speed operation is achieved by accurately sizing the counterweights and spring S2 force.

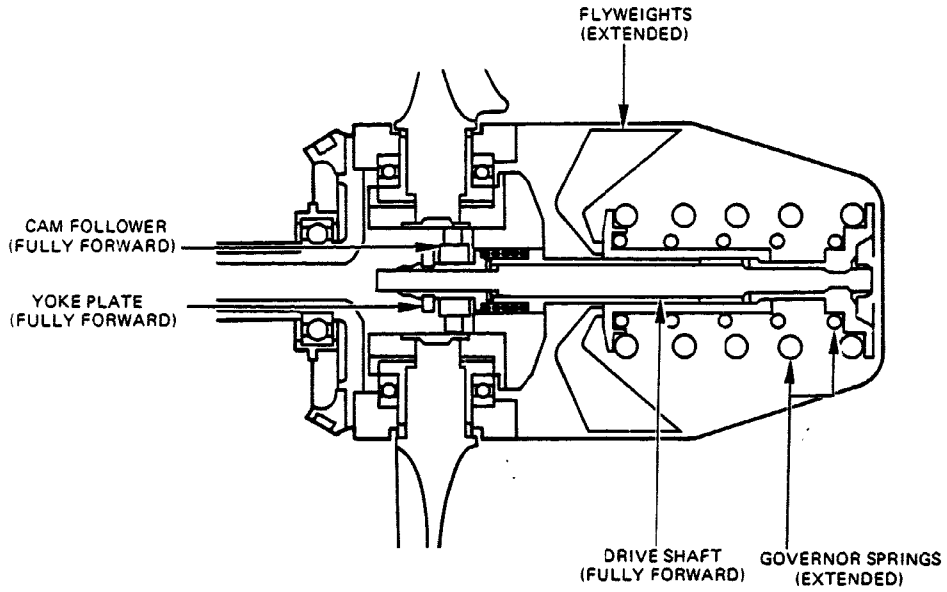
The governor shown in Figure (Ref. Fig. 008) (B) has the blades shown in coarse pitch.

The governor shown in figure (Ref. Fig. 009) (C) has the blades shown in startup and fine pitch operation

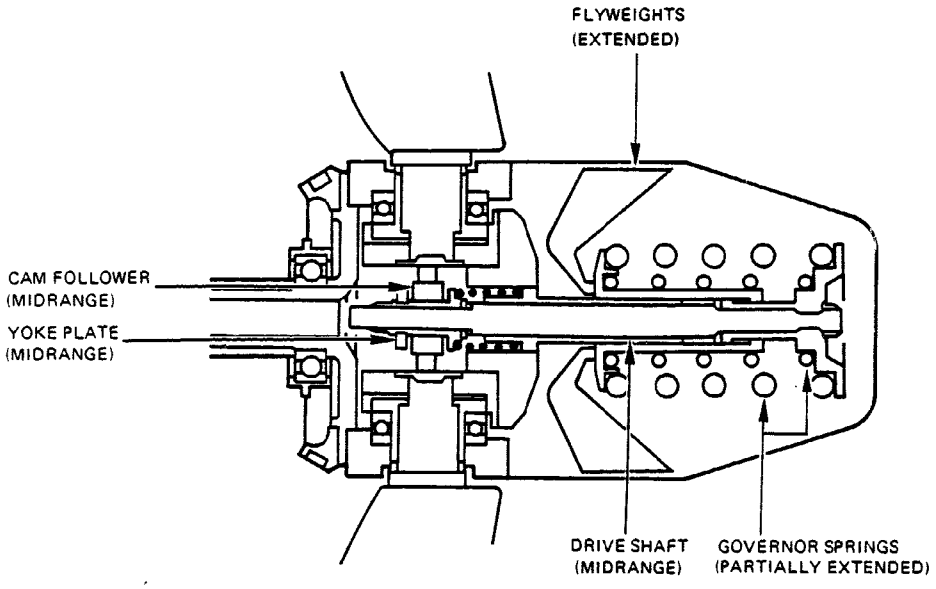
The governor shown in fig. (Ref. Fig. 009) (D) has the blades shown in intermediate pitch operation (governing position).



Ram Air Turbine Operating Configuration
Figure 008



START UP AND FINE PITCH OPERATION (FIG.C)



INTERMEDIATE PITCH OPERATION (FIG.D)

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Ram Air Turbine Operating Configuration
Figure 009

7. Ground Check

R A. Ground Test Unit

The ground test unit provides a visual indication of the operating status of the RAT during ground checkout. This electronic unit contains a switch that energizes the spool valve in the checkout module, a light that indicates that governing speed has been reached and an oil pressure indicator that indicates that the system has been re-pressurized once ground checkout has concluded.

A lamp test switch is used to check that the indicator lights are not burned out. An indicator light, marked OVERSPEED, will come on if the turbine is operating at more than 4600 revolutions per minute.

If the turbine is operating below the governed speed range neither govern speed or overspeed indicators will be on.

A cable, that is stored in the top of the ground test unit, provides electrical connections between the solenoid operated valve on the ground checkout module and the electrical connector on the ground test unit.

B. Test Operation (Ref. Fig. 010, 011)

To functionally check the RAT when the aircraft is on the ground, an electrical cable must be connected between the ground test unit electrical connector and the solenoid operated valve on the ground checkout module.

When the function switch is positioned to SPIN (backdrive), the solenoid operated valve of the ground checkout module will cause the spool valve assembly to move to the backdrive position. In the backdrive position, the normal RAT to aircraft hydraulic system fluid flows are reversed (Ref. Fig. 010).

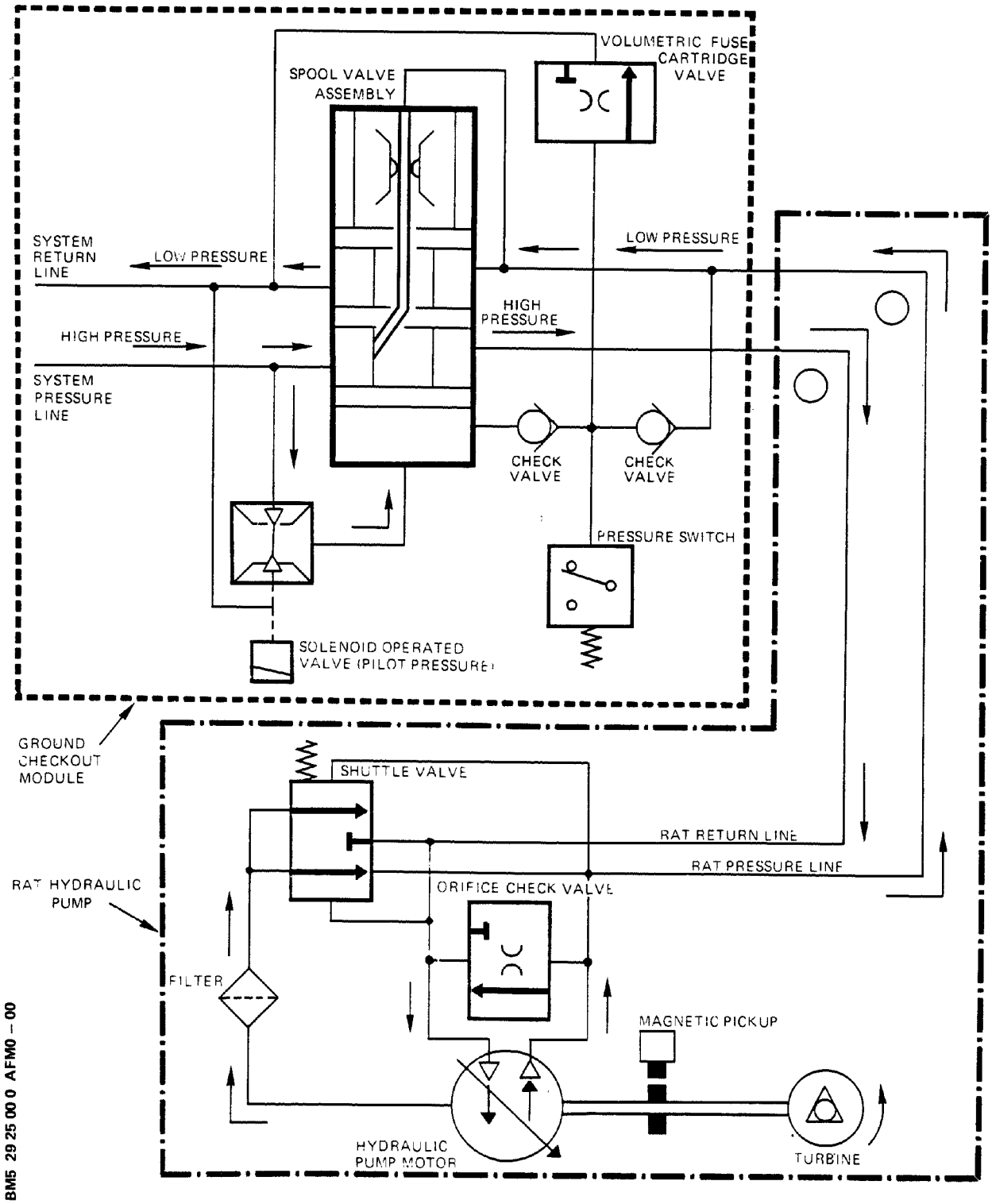
In this reversed position the aircraft hydraulic system becomes the power source that causes the hydraulic pump to operate as a motor and drive the turbine in its normal direction of rotation. The power available from the hydraulic pump, while it is functioning as a motor, is greater than the turbine can absorb with the turbine blades in the fine pitch position.

At this point, the governor should begin to change the turbine blade pitch angle. Proper operation of the governing function will be indicated by illumination of the green indicator light on the ground test unit. If the governor is not functioning properly, either the red indicator light on the ground test unit will come on or there will be no light indication. When the function switch is placed in the PUMP position, the solenoid operated valve will be de-energized. De-energizing allows the spool valve assembly to return to its normal position, which will cause the RAT and aircraft hydraulic system flows to return back to their normal position (Ref. Fig. 011).

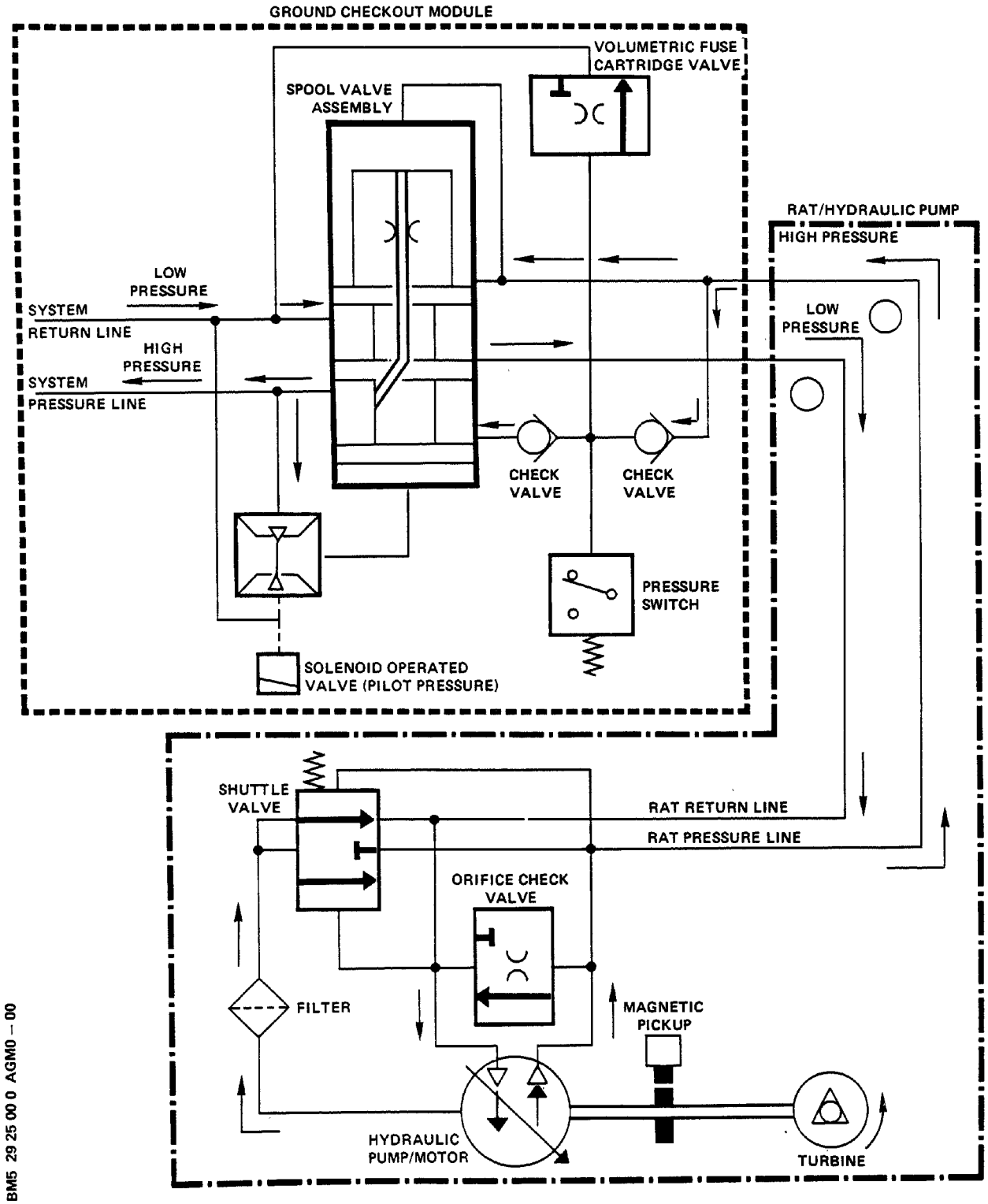
During this rundown period, the RAT will supply pressure to the aircraft hydraulic system, which will cause the ground checkout module pressure switch to send a signal that will cause an indicator display change. When this indicator changes to a white display, it will verify that the system has returned to its normal mode.

When RAT is stowed, the orifice plug in the spool valve assembly of the ground checkout module permits a warning flow (Ref. Fig. 012) of low pressure hydraulic fluid through the RAT shut. The warning flow prevents build-up of sludge in RAT and makes sure of immediate operation when RAT

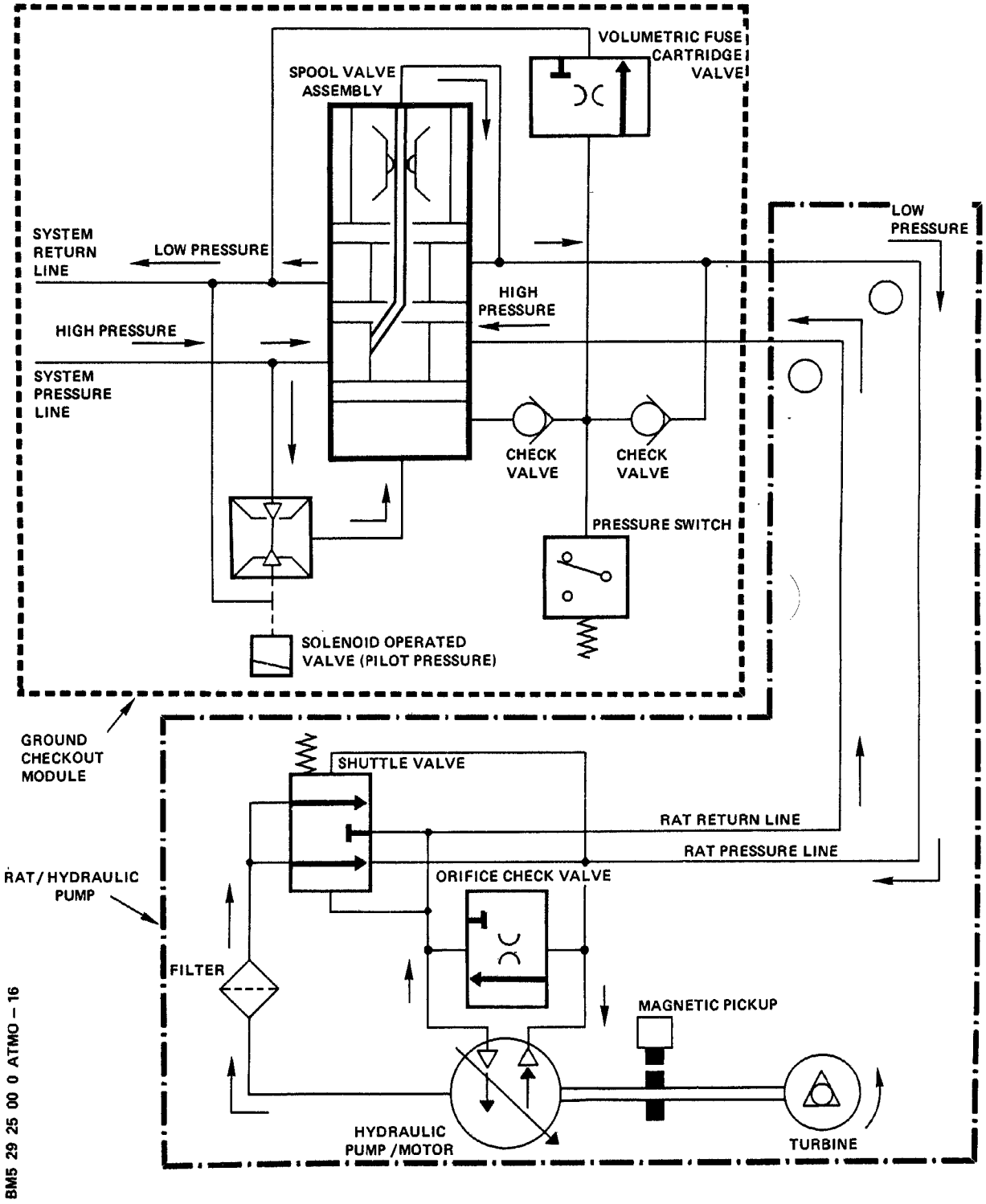
is deployed.



Ram Air Turbine/Hydraulic Pump System Components - Ground Checkout Position
Figure 010



Ram Air Turbine/Hydraulic Pump System Components - Normal Position
Figure 011



Ram Air Turbine/Hydraulic Pump System Components - Warning Flow
Figure 012

YELLOW AUXILIARY POWER (RAM AIR TURBINE) - SERVICING

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS ARE IN POSITION.
POSITION SAFETY BARRIERS AND DISPLAY WARNING NOTICES AROUND RAT EXTENSION AREA.
MAKE CERTAIN NO PERSONNEL IS WITHIN RAT EXTENSION AREA.

1. Reason for the Job

A. RAT Extension and Retraction for maintenance purposes.

2. Equipment and Materials

ITEM	DESIGNATION
A. 97A29002500000	Protective Equipment-Ram Air Turbine
B.	Protective Barriers
C.	Warning Notices
D.	Access Platform, 2.60 m (8 ft. 8 in.)
E.	Inspection Mirror
F.	Borescope Equipment
G.Material No. 11-026	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 20-23-14, P. Block 1	Protection from Vibration and Chafing of Hydraulic Pipes
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-27, P. Block 401	Ram Air Turbine
R - 57-20-28, P. Block 401	Ram Air Turbine/Yoke Attachment Fitting

3. Procedure

(Ref. Fig. 301)
(Ref. Fig. 302)

A. Job Set-UP

WARNING : INSTALL SAFETY BARRIER TO KEEP PERSONNEL AWAY FROM RAT OPERATING AREA.

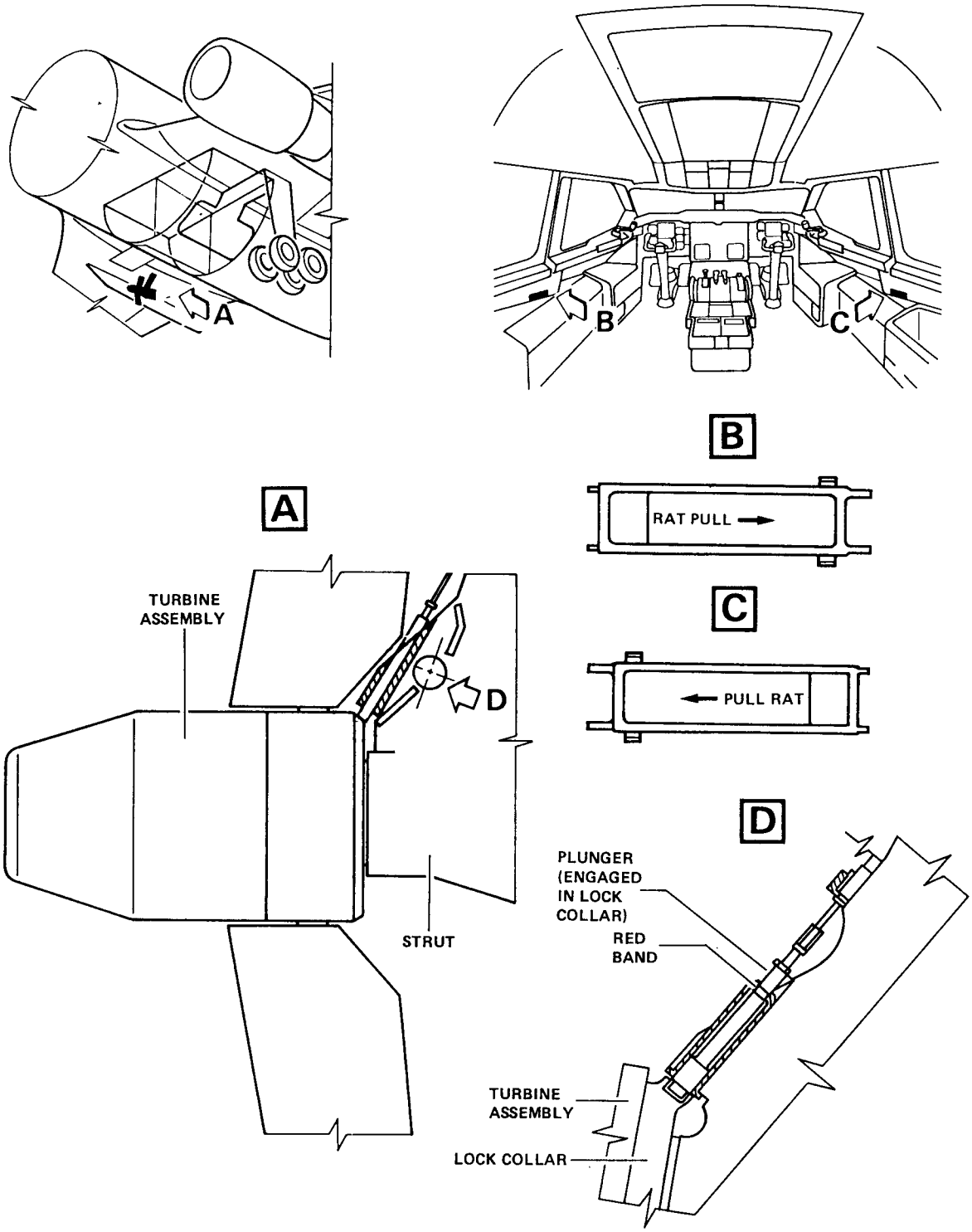
WARNING : BEFORE EXTENDING RAT, MAKE CERTAIN THAT RAT EXTENSION AREA IS FREE FROM PERSONNEL AND EQUIPMENT. DO NOT STAND DIRECTLY BEHIND RAT OR IN ITS EXTENSION ARC WHILE DEPLOYING.

WARNING : BECAUSE OF THE POSSIBILITY OF ACCIDENTAL EXTENSION NO SERVICING OR MAINTENANCE IS TO BE PERFORMED ON RAT WHILE STOWED.

(1)Install protective barriers around work area.
(2)Prohibit opening of right main gear main door.
(3)Position access platform at zone 671.

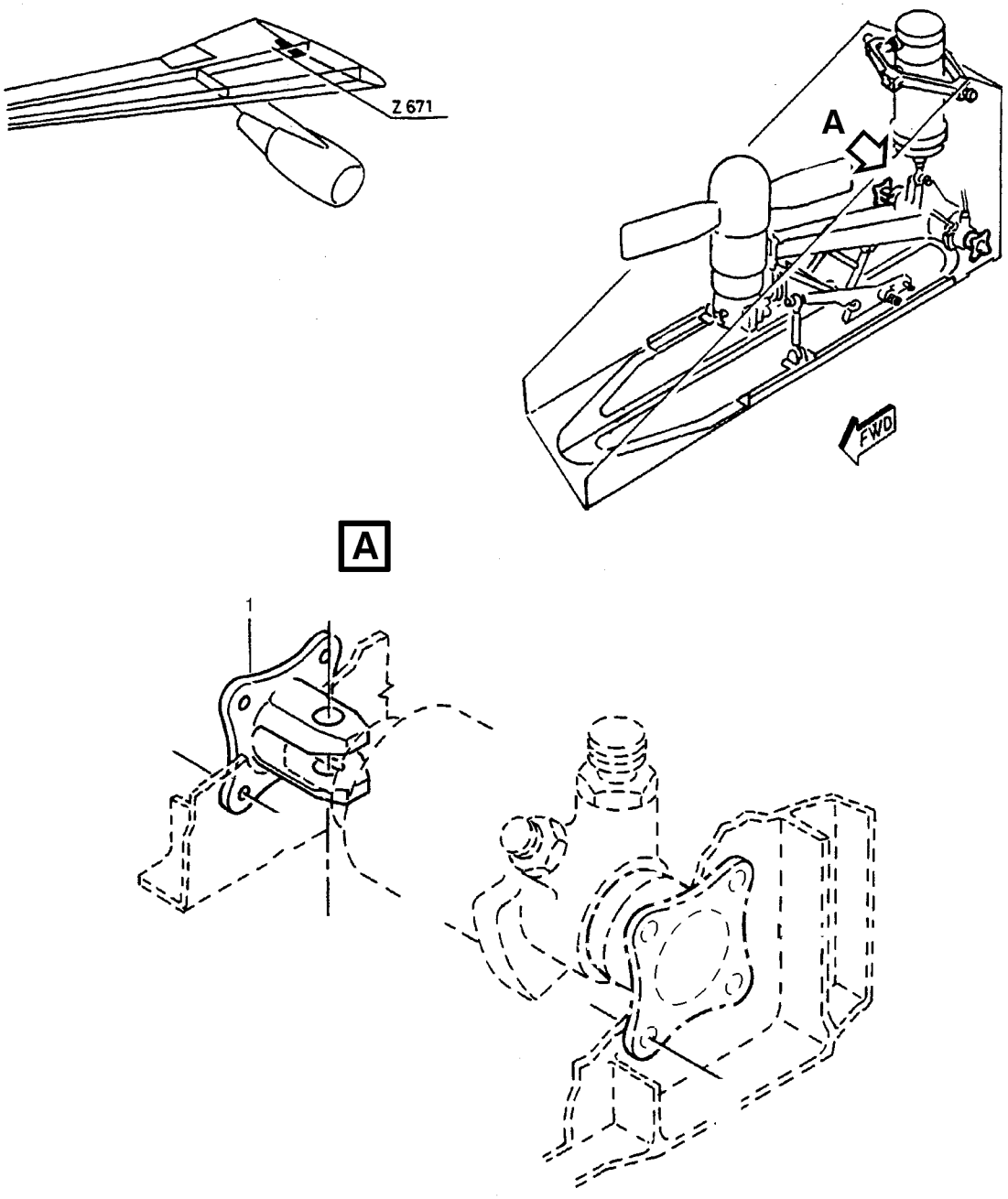
B. RAT Extension

(1)Install protective equipment.
(2)In flight compartment, extend RAT by pulling one of the two control handles.
(3)Check :



RAT Control Handle Location, and plunger engaged position
Figure 301

R



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Yoke Fitting
Figure 302

- control handle locking in pulled position
- RAT uplock release, extension and locking in extended position
- doors opening then locking at end of travel.

(4)Push control handle into its housing.

WARNING : AFTER THE RAT HANDLE IS RETURNED TO ITS HOUSING, CHECK THAT THE CABLE QUADRANT BELLCRANK ASSIES ARE ON THEIR MECHANICAL STOPS.

NOTE : RAT adjustment/test procedure is described in 29-25-00, P. Block 501.

(5)Check same operation with second RAT control handle.

C. RAT Retraction

R (1)Check that "RAT extended" locking stud engages in the oblong housing with a gap of 0.5 mm (0.020 in.) minimum to 1.0 mm (0.039 in.) maximum measured between the top part of the oblong housing and the locking stud.

(a)If these conditions are not obtained, adjust RAT extension jack (Ref. 29-25-00, P. Block 501).

R (2)If required, disconnect RAT test set.

R (3)Remove protective equipment.

R (4)Make certain that there are no hydraulic fluid leaks and that hardware is correctly safetied and in good condition.

R (5)Check condition of blades ; no deformation nor trace of impact is permissible.

R (6)Do the manual blade (governor) twist test.

R (a)Manually turn both RAT blades carefully to the fine-pitch stop position
R (twisting range approx. 51 degrees) against the spring pressure,
R grasping each blade near the blade root. Quickly release the blades
R and let the spring pressure push the blades to the coarse-pitch
R position. Do this action three times and make sure that the blades
R go back to the hard stop at the full coarse-pitch position.

R (b)Replace the turbine assembly if the blades do not touch the hard stop
R at the full coarse-pitch position.

R (7)Make certain that uplock hook is open and release lever is fully retracted to allow uplock assembly to latch.

R (8)Pull knobs on door bracket assembly to the retracted position and rotate knobs clockwise to lock in place.

CAUTION : MAKE CERTAIN THAT BLADES ARE AGAINST COARSE PITCH STOP BEFORE RAISING RAT.

CAUTION : MAKE CERTAIN THAT BLADE LOCK PIN WILL ENGAGE SLOT IN THE REAR OF TURBINE BEFORE RETRACTING RAT. WHEN BLADE LOCK PIN IS PROPERLY ENGAGED, TURBINE WILL NOT ROTATE.

CAUTION : DO NOT GRASP RAT BY TURBINE ASSEMBLY COVER OR TURBINE BLADES WHEN MANUALLY RAISING THE RAT.

R (9)Rotate turbine assembly to align arrows on turbine assembly and strut to position blades in vertical position for RAT retraction.

R (10)Retract downlock plunger installed at upper section of RAT strut housing.

R (11)Push RAT up by hand while trying to rotate turbine assembly to make certain that plunger is engaged.

NOTE : Visual alignment marks indicate alignment of turbine assembly and strut. A witness line confirms proper seating of the bladelock plunger.

R (11)Carry out slow retraction of RAT and check that lockout plunger engages in lock plate at an angle comprised between 4 and 5 deg. from fully extended position.

R (12)Check that spinner can no longer rotate. If locking conditions are not fulfilled, adjust bladelock plunger (Ref. 29-25-00, P. Block 501, Para. 1.C.(2)(e)).

CAUTION : AN INCORRECT LOCKING OF RAT SPINNER CAN CAUSE, DURING IN-FLIGHT EXTENSION, EITHER JAMMING OF BLADES IN RAT STOWAGE COMPARTMENT OR DETERIORATION OF COMPARTMENT DOORS AND RAT BLADES.

R (13)Fully retract RAT by hand in its stowage compartment.

CAUTION : THE RAT SHALL BE CLAMPED BY THE UPLOCK UNIT AT THE FIRST ATTEMPT. IF NOT, REMOVE UPLOCK UNIT FOR OVERHAUL.

CAUTION : PROCEED WITH CARE FOR MANUAL RETRACTION OF RAT. DO NOT PLACE HANDS OR TOOLS IN RAT STOWAGE COMPARTMENT.

R (14)Visually check RAT is correctly locked in uplock unit.

WARNING : DO NOT STAND IN DEPLOYMENT PATH WHEN RAT IS IN STOWED POSITION.

WARNING : MAKE CERTAIN THAT RAT UPLOCK ROLLER IS FULLY ENGAGED IN UPLOCK HOOK.

R (15)Do an inspection of the bottom flange of the RAT swivel coupling yoke
R fitting (Ref. Fig. 302).
R (a)Apply Material No. 11-026 (Ref. 20-31-00) with a clean and soft brush
R on the swivel coupling yoke area.
R (b)Make sure that the flange of the yoke fitting (1) is not broken.
R Use an inspection mirror or a borescope equipment if necessary.
R . If the flange of the yoke fitting (1) is broken, remove the RAT
R (Ref. 29-25-27, P. Block 401) and replace the RAT swivel coupling
R yoke fitting (1) (Ref. 57-20-28, P. Block 401).

(16)Visually check for a clearance of 10 mm mini between the RAT hub and the hydraulic hoses. If clearance condition is not fulfilled, rework binding in accordance with AMM 20-23-14.

(17)Release knobs on door bracket assembly to the extended position.

(18)Close RAT right door then left door and check them for flushness.

D. Close-Up

(1)Remove all ground handling and maintenance equipment, standard and special tools together with ground power equipment, all access equipment and miscellaneous items.

YELLOW AUXILIARY POWER (RAM AIR TURBINE) - ADJUSTMENT/TEST

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.
CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Ram Air Turbine Adjustment and Tests
(Ref. Fig. 501)

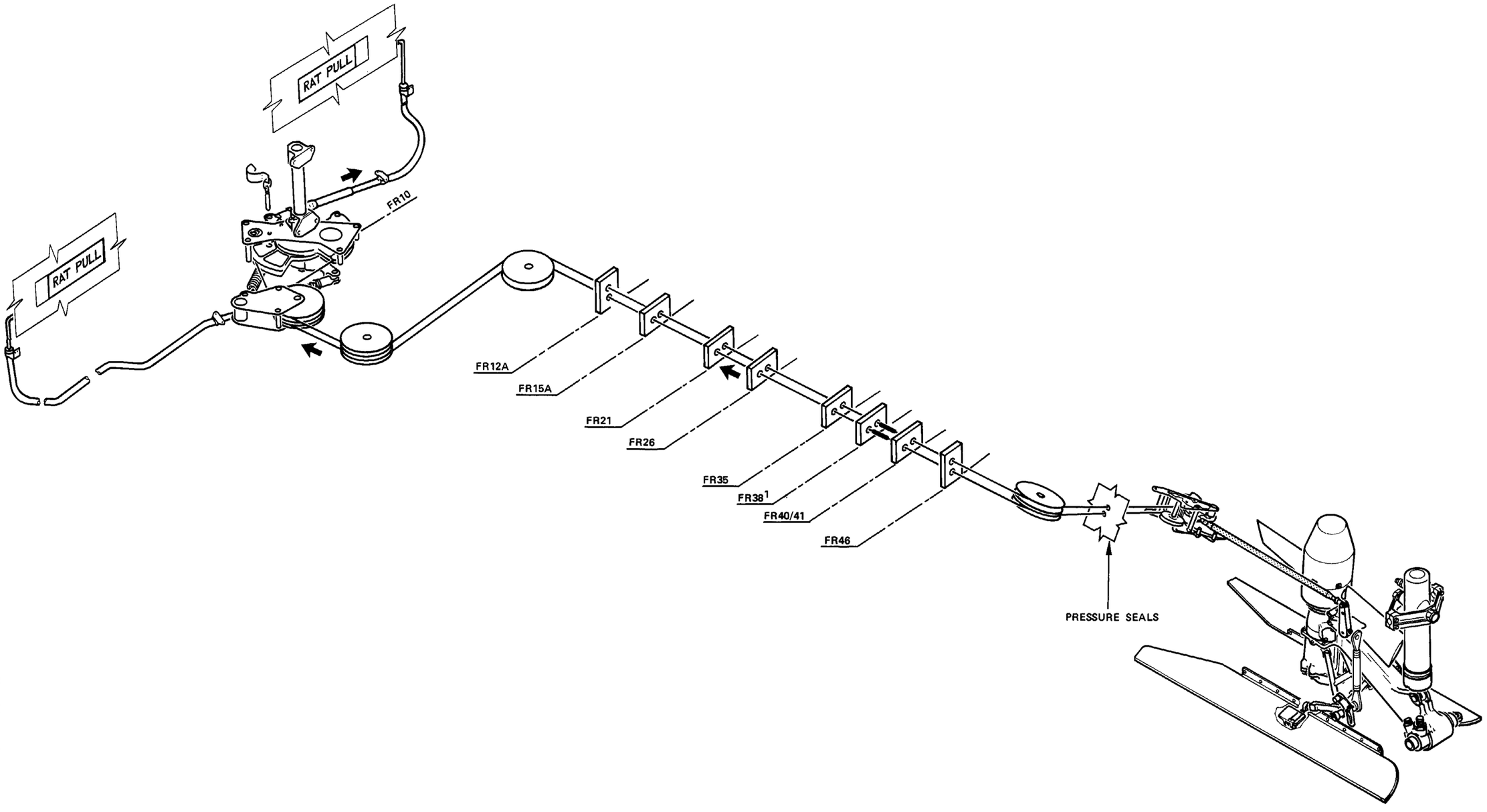
A. Reason for the Job
(1)Adjustment of Ram Air Turbine mechanical control system.

B. Equipment and Materials

	ITEM	DESIGNATION
	1. 98A29201000000	Pin - Rigging, RAT Drop Out Controls
	2. 98A29201001000	Pin - Rigging, RAT Drop Out Controls
	3. 98A49601000000	Pin - Rigging, RAT Controls
	4. 98A29203000000	Quadrant - Graduated, Ram Air Turbine Control
	5. WAS35286	Wrench Adjusting
R	or	
R	AGE14884	Wrench Spanner
	6. WAS35287	Wrench Adjusting
R	or	
R	AGE14885	Wrench Spanner
	7. Material No. 04-004	Common Greases (Ref. 20-31-00)
	8. Material No. 08-007	Bonding and Adhesive Compounds (Ref. 20-31-00)
	9. Material No. 08-009	Bonding and Adhesive Compounds (Ref. 20-31-00)
	10. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
	11.	Access Platform 2.6 m (8 ft. 8 in.)
	12.	Tensiometer
	Referenced Procedures	
	- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
	- 29-25-26, P. Block 401	Ram Air Turbine Uplock Mechanism
	- 52-33-00, P. Block 1	Cargo Compartment Doors Hydraulic System

C. Procedure

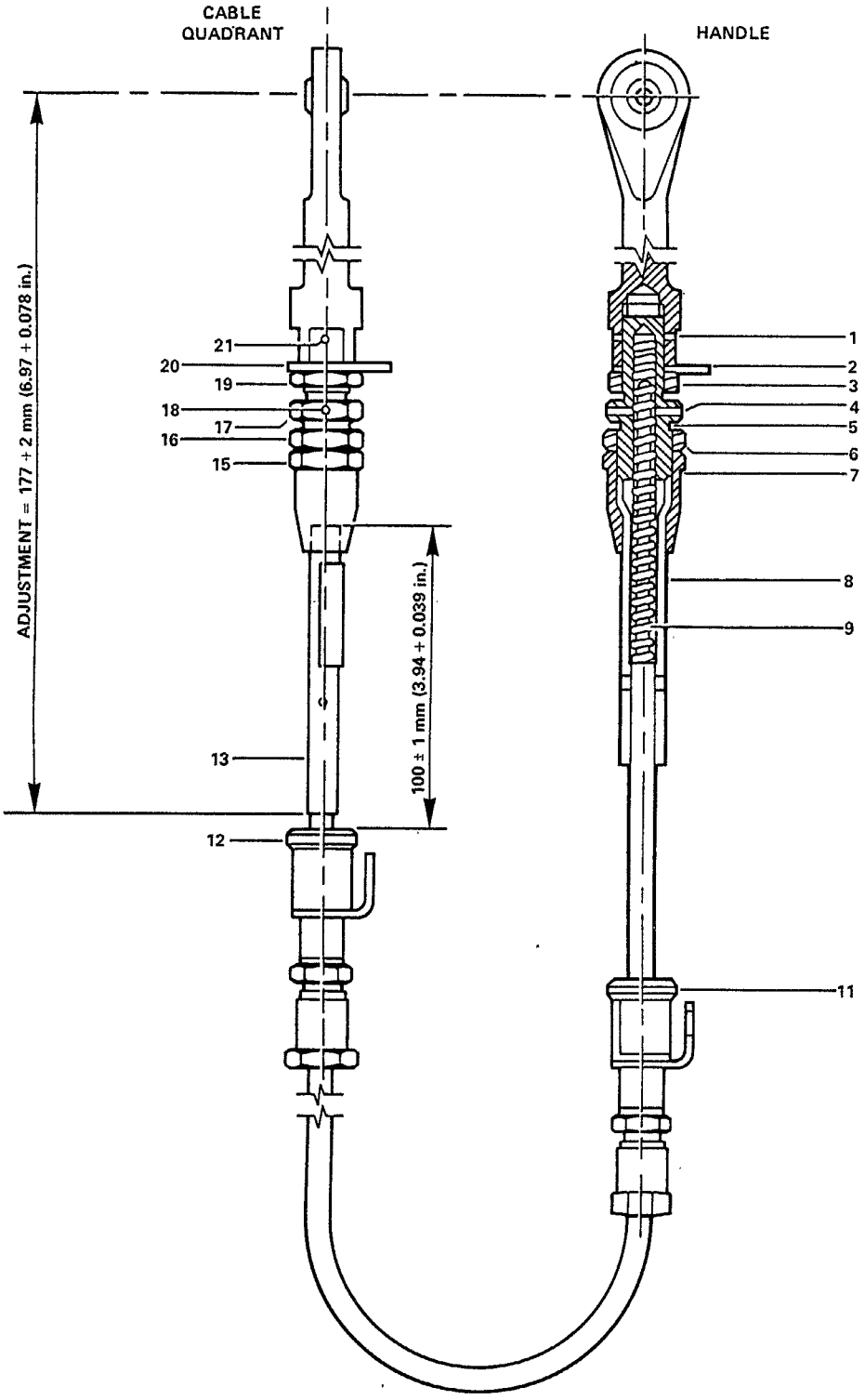
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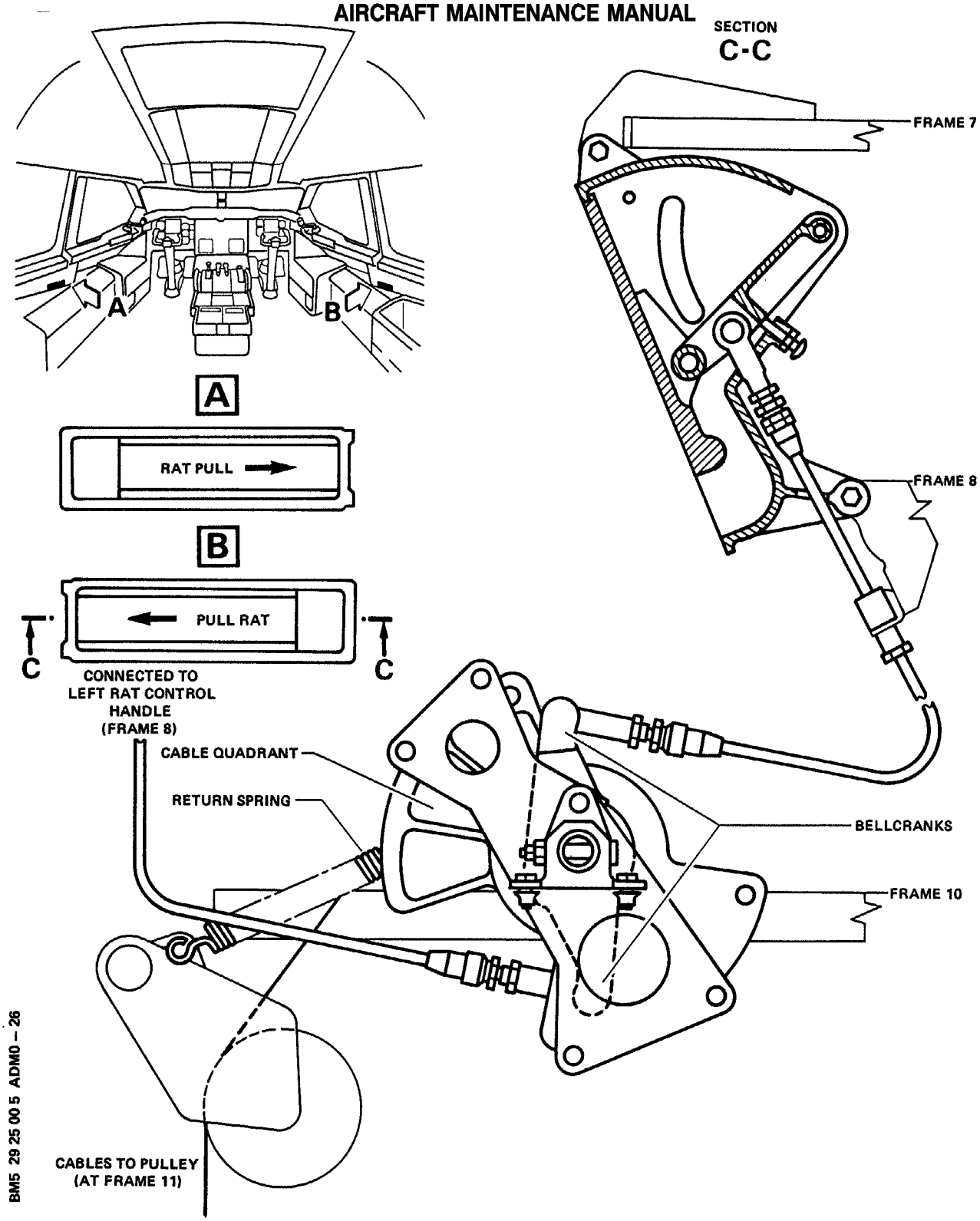
RAT Control System
Figure 501

(1)Job set-up
(a)Under zone 671, position safety barriers and warning notices around RAT extension area.
(b)Make certain that RAT extension area is clear of personnel and miscellaneous items of equipment
(c)Slowly extend RAT by pulling one of the two control handles, and, by means of equipment, measure load applied :
load must be less than 15 daN (33.75 lbf.).
(d)Make certain that RAT is extended and locked, make certain that doors are locked.
(e)When RAT is extended, in flight compartment, push control handle into its housing.
WARNING : AFTER THE RAT HANDLE IS RETURNED TO ITS HOUSING, CHECK THAT THE CABLE QUADRANT BELLCRANK ASSIES ARE ON THEIR MECHANICAL STOPS.
(f)Check correct operation of second RAT control handle.
(g)Open forward cargo door 811 (Ref. 52-33-00, P. Block 1)
(h)Open access door 132AZ
(j)Position access platform at zone 671
R 1 At zone 671, open access door 671BB.
(2)Adjustment
Adjustment data is given in the following order :
- flexible cable control adjustment (FR8 to FR10)
- cable linkage adjustment (FR10 to FR47)
- adjustment of RAT assy and of extension jack
- adjustment of RAT extension unlocking angle
- adjustment of mechanical control (FR47 to FR50)
- adjustment of blade lock plunger
(a)Flexible cable control adjustment (FR8 to FR10)
(Ref. Fig. 502)
1 In flight compartment, make certain that RAT control handles are locked in their housings.
(Ref. Fig. 503)
2 Insert rigging pin 98A49601000000 in quadrant located at STA972 (FR10).
3 Make certain that end fittings of RH and LH flexible cable controls are correctly assembled and fitted with new lockwashers (2,20).
4 Make certain that collet-type fitting cone (7) and locknuts (3,6) are correctly tightened on eye end fittings connected to control handle bellcranks.
5 On eye end fittings connected to control handle bellcranks, check through witness holes (1,4) that cable (9) and threaded end fitting (5) are visible.
6 At end of flexible cable controls connected to quadrant cranks, unlock locknuts (16) and (19).
7 Loosen collet-type fitting cone (15) from threaded end (17).
8 Using a wrench turn the hexagon nut of threaded end fitting (17) until bellcrank of cable quadrant cranks (FR10) reaches its stop. Tighten collet-type fitting cone (15) and locknuts (16,19). After adjustment, make certain through witness holes (18,21) that cable (9) and threaded end fitting (17) are visible.



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Flexible Cable Control
Figure 502



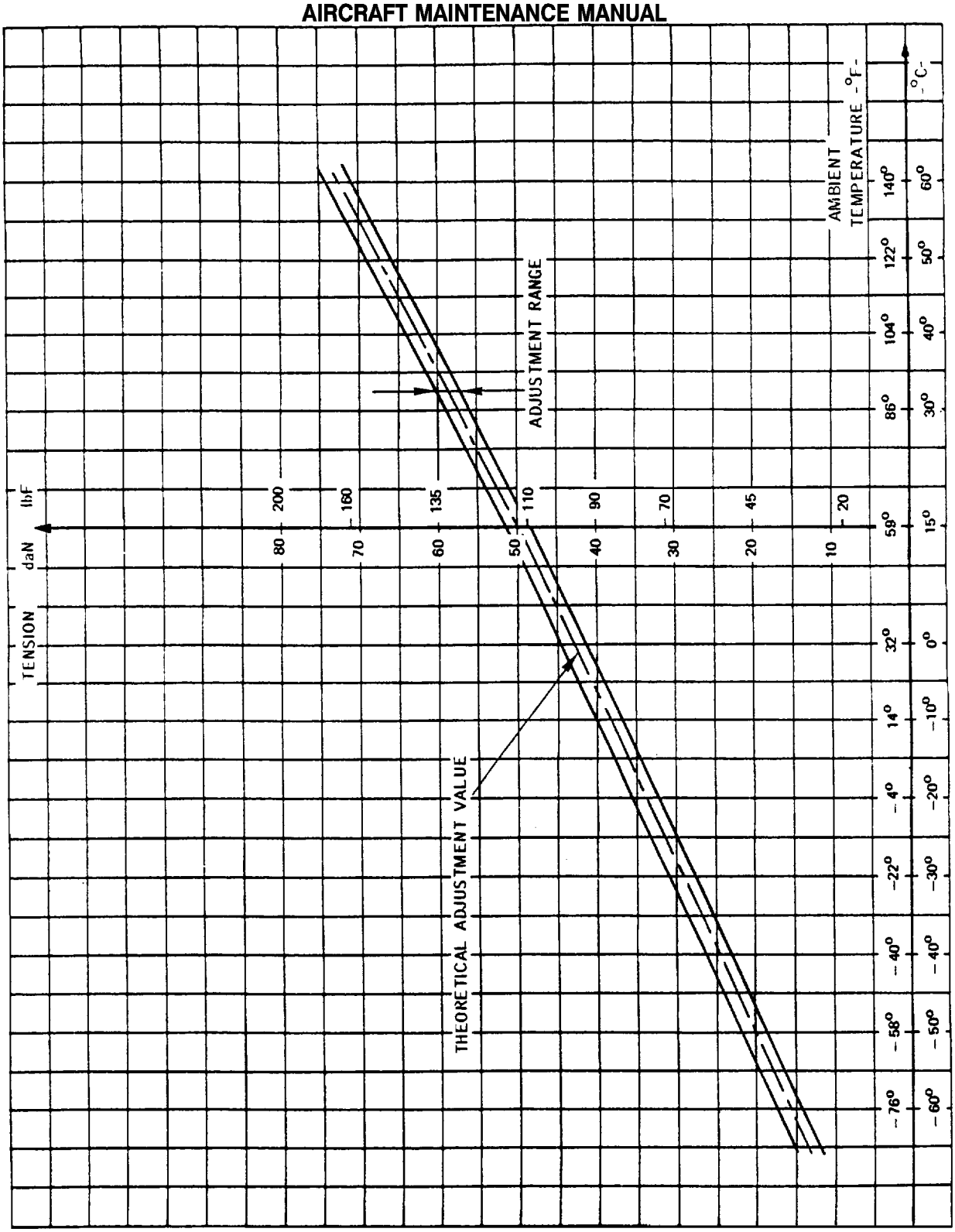
RAT Control Between FR7 and FR10
Figure 503

9 If length obtained is insufficient with end fitting (17) connected, turn end fitting (5) connected to control handle bellcrank.
10 When length is correctly adjusted, tighten locknuts (3) and (6) at collet-type fitting and eye end.
11 Remove rigging pin from quadrant.
12 Carry out the following checks on both flexible cable controls.
- unlock and pull control handle.
  Make certain that it is possible to lock handle in pulled position.
  Make certain that there is a clearance between sliding tube (13) and swivel fitting tube (12).
- unlock and push control handle into its housing.
- on end fitting connected to control handle bellcrank, make certain that there is a clearance between sliding tube (8) and swivel fitting tube (11).

13 At quadrant at STA972 (FR10), make certain that rigging pin can be easily inserted and removed.
14 Re-adjust if necessary
15 Fold back tabs of lockwashers (2,20) on to flexible control end fitting locknuts (3,19).

(b)Cable linkage adjustment (FR10 to FR47)
(Ref. Fig. 504)

1 In flight compartment, push control handle into its housing.
R 2 At FR10 insert rigging pin 98A49601000000 in RAT quadrant.
R 3 Make certain that cable end fittings are correctly positioned in their respective retaining notches.
R 4 In zone 671, insert rigging pin 98A29201001000 in fuselage-to-wing RAT control feedthrough bellcrank assembly.
R 5 Make certain that cable guides of pressure seals can be freely orientated.
R 6 In forward cargo compartment at FR38.2, remove sidewall panel 132SW to get access to turnbuckles located between FR38 and FR40.
R 7 Remove and discard safety clips from cable turnbuckles between FR38 and FR40.
R 8 Make certain that cable end fittings are screwed into turnbuckle barrels by an equal number of threads. Threads must not be visible when cable is in maximum slack position.
R 9 Turn turnbuckle barrels until cable tension corresponds to ambient temperature as shown on graph; equalize tension on both cables using tensiometer.
R 10 Remove rigging pins from quadrant and from fuselage-to-wing RAT control feedthrough bellcrank assy.
R 11 Operate both control handles several times in order to stabilize control system.
R 12 Push control handles into their housings.
R 13 Make certain that rigging pins can be easily removed and inserted in quadrant and in fuselage-to-wing RAT control feedthrough bellcrank assy.
R 14 Lock the two turnbuckles with safety clips.
R 15 Remove rigging pins.
R 16 In forward cargo compartment at FR38.2, install sidewall panel 132SW



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Cable Tension Regulating Graph
Figure 504

R

R located between FR38 and FR40.

(c)Adjustment of RAT assy.
(Ref. Fig. 505)
(Ref. Fig. 506)
(Ref. Fig. 507)

1 Retract RAT in its stowage compartment (Ref. 29-25-00, P. Block 301).

2 With RAT retracted, make certain that roller is properly centered in uplock hook (Gap between roller and uplock hook : 1.5 + 0.2 mm - 0.5 mm (0.059 + 0.0078 in. - 0.019 in)).
If not, perform the following operations :

a Extend RAT (Ref. 29-25-00, P. Block 301).

b Hold uplock pin by wrenching flats and remove cotter pin, nut, washer, and roller from uplock pin.

c Make certain that uplock pin has not loosened in strut housing assembly while removing nut. If uplock pin is loose, reinstall as follows :

- Remove offset bushing from uplock pin, noting position for reassembly.
- Remove uplock pin from strut housing assembly.

WARNING : MATERIAL No. 11-004 IS TOXIC. DO NOT BREATHE VAPORS. USE IN WELL VENTILATED AREA FREE FROM SPARKS, FLAME, OR HOT SURFACES. WEAR SPLASH GOGGLES, SOLVENT-RESISTANT GLOVES, AND OTHER PROTECTIVE GEAR.
IN CASE OF EYE CONTACT, FLUSH WITH WATER AND SEEK MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, WASH WITH SOAP AND WATER.

- Clean threads of uplock pin that screw into strut housing assembly with Material No. 11-004. Allow solvent to evaporate for a minimum of 5 minutes.

WARNING : MATERIAL No. 08-007 AND PRIMER ARE TOXIC. USE IN WELL VENTILATED AREA. PREVENT EYE AND SKIN CONTACT AND DO NOT BREATHE VAPORS. IN CASE OF EYE CONTACT, FLUSH WITH WATER AND SEEK MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, WASH WITH SOAP AND WATER.

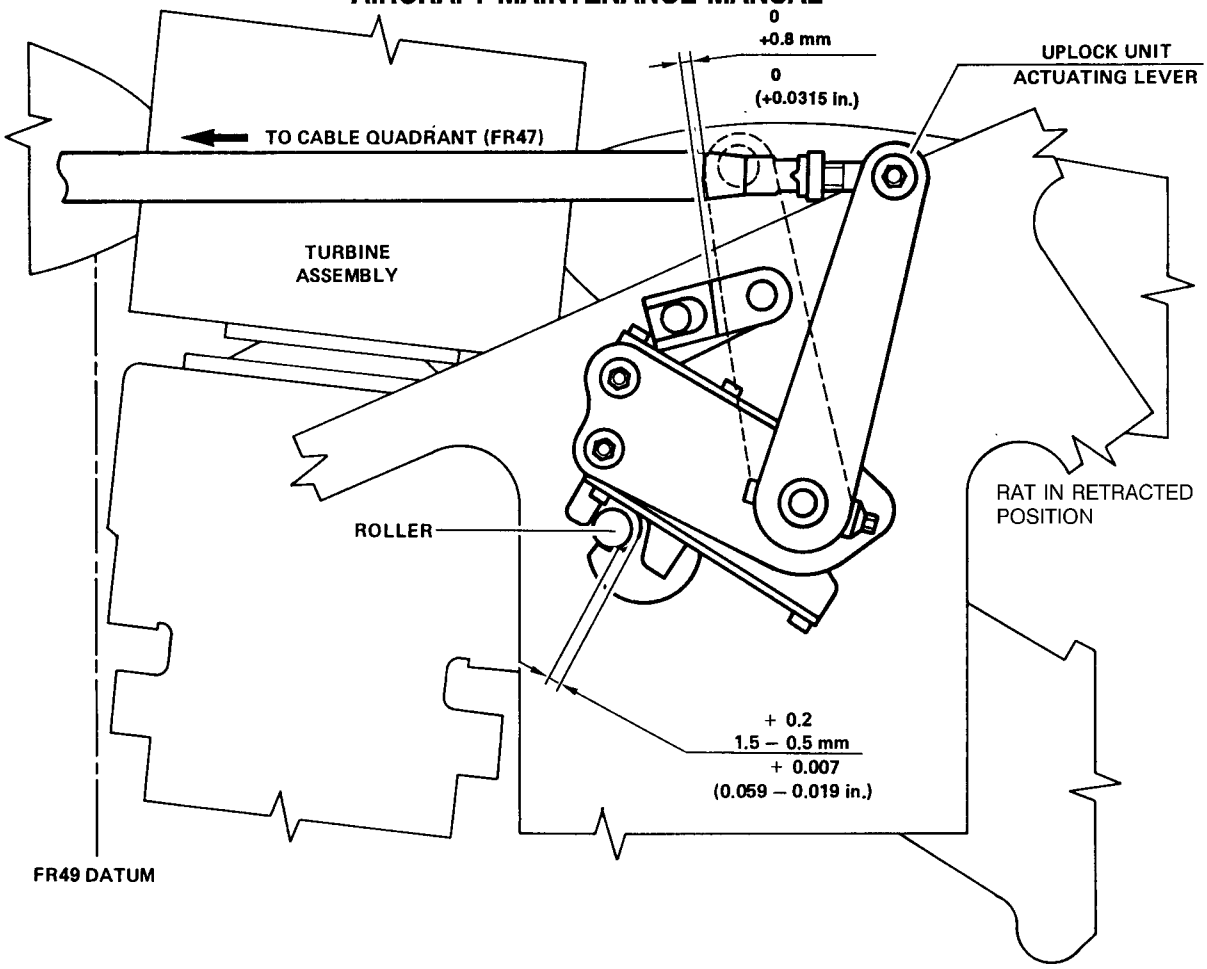
NOTE : Apply primer within 1 hour after cleaning operation to prevent oxidation.

- Apply Material No. 08-009 to all installation threads of uplock pin. Allow primer to dry a minimum of 5 minutes.
- Apply Material No. 08-007 to installation threads of uplock pin.
- Install uplock pin into strut housing assembly and torque to between 1.35 and 1.46 m.daN (9.95 and 10.75 (lbf.ft).
- Wipe off any excess compound.
- Install offset bushing on uplock pin in original position.

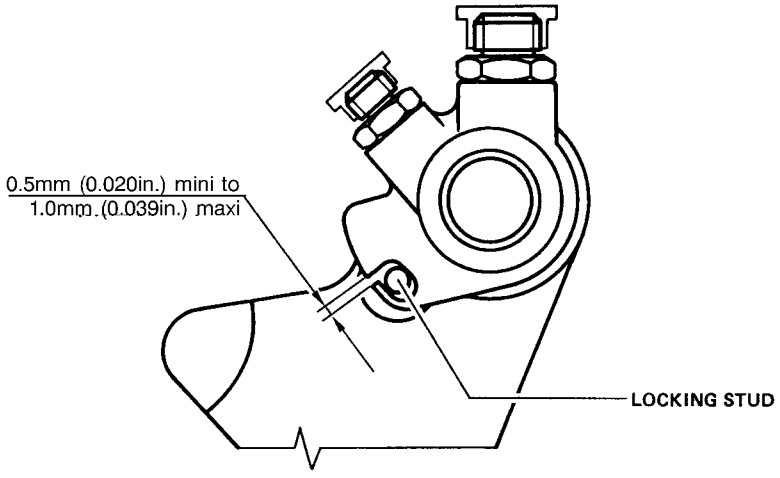
d Remove offset bushing from uplock pin far enough to clear pin and rotate to move uplock roller up or down.

e Install offset bushing the rest of the way on uplock pin making certain that one of the slots in the offset bushing is lined up with the pin.

f Apply a light coat of Material No. 04-004 to inside diameter of uplock roller.



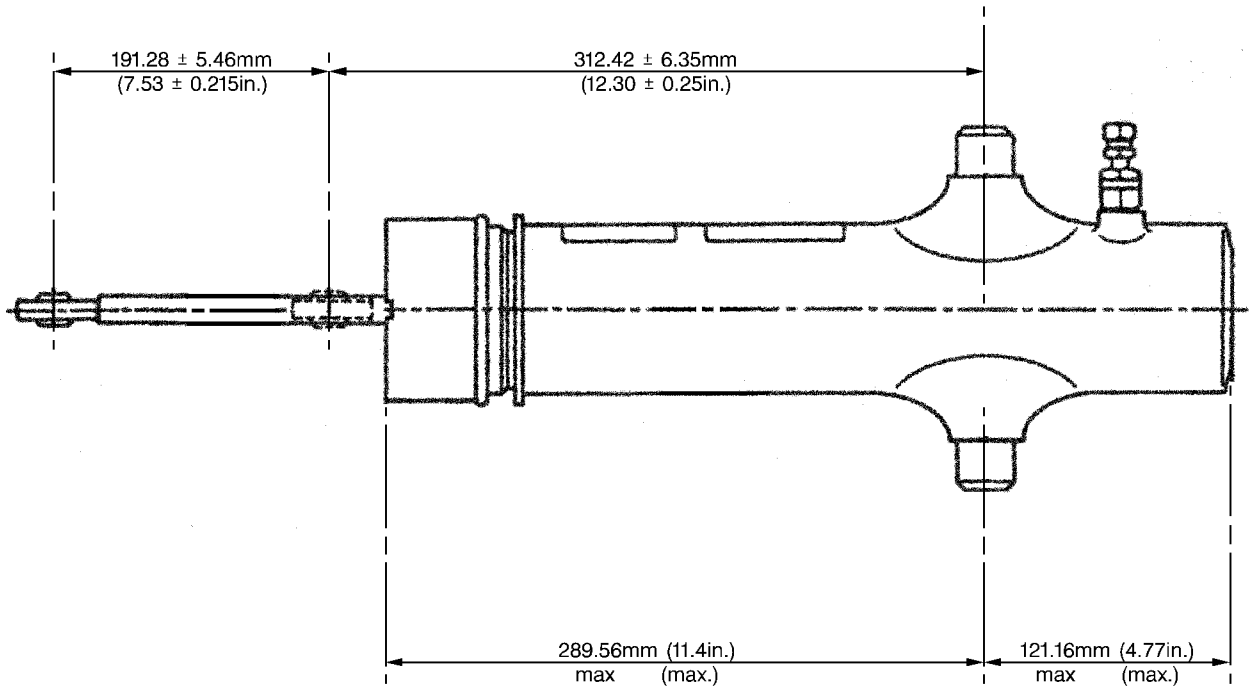
RAT IN EXTENDED POSITION



BM5 29 25 00 5 AEM0 03

RAT Control - Adjustment
Figure 505

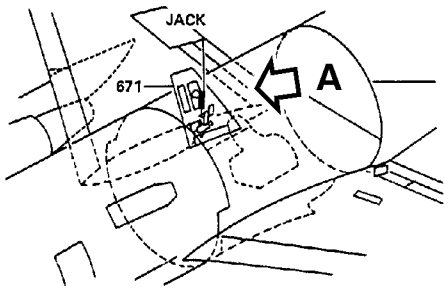
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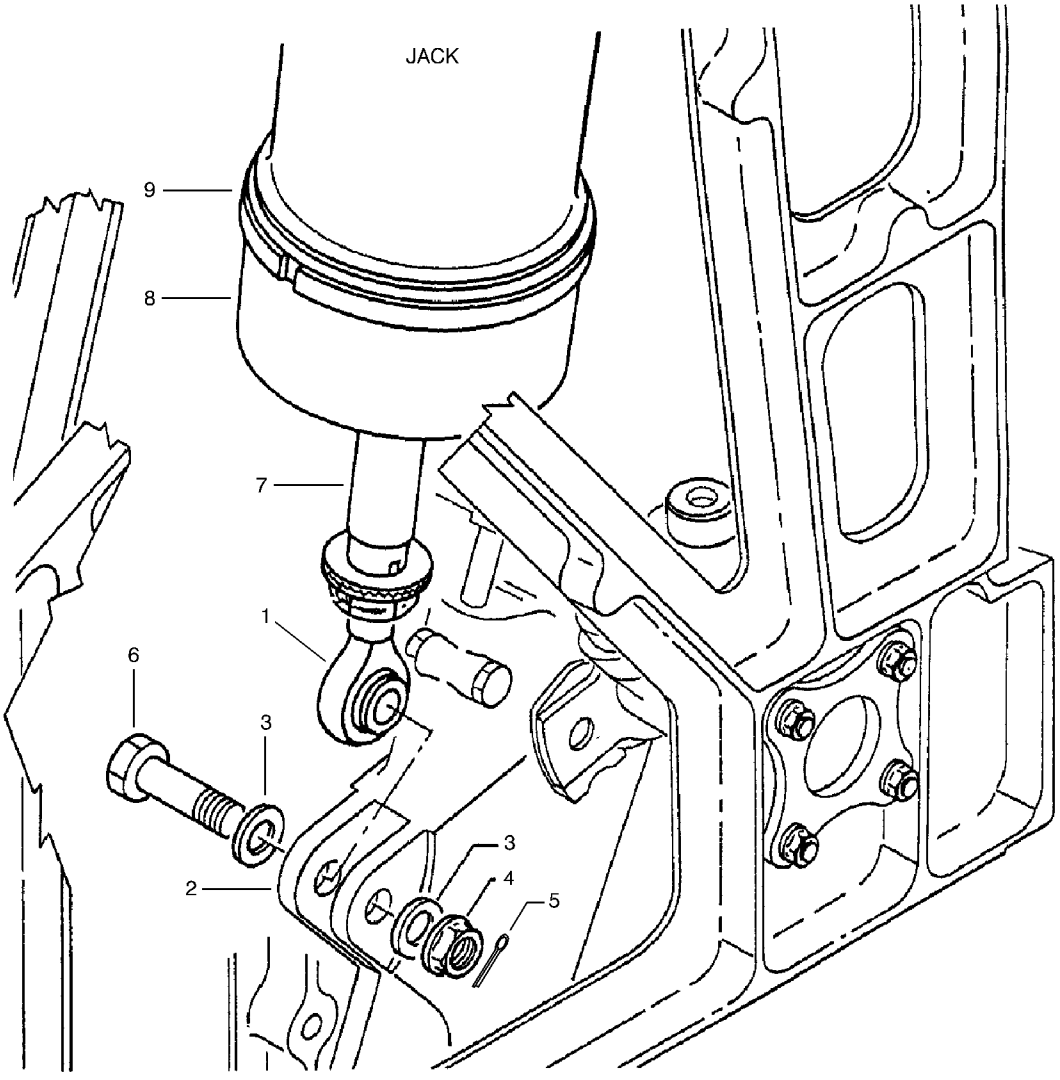


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R

Extension Jack - Adjustment
Figure 506





BM5 29 25 00 5 AVM0 00

Disconnection/Connection of the Ejection Jack Eye End
Figure 507

g Retract RAT (Ref. 29-25-00, P. Block 301) and check for proper locking of roller in uplock hook. Re-adjust if necessary.

h When proper adjustment is obtained, TORQUE roller retaining nut to between 0.52 and 0.58 m.daN (46 and 51 lb.in.) Safety nut with cotter pin.

3 Extend RAT (Ref. 29-25-00, P. Block 301) then check that "RAT extended" locking stud engages in the oblong housing with a gap of 0.5 mm (0.020 in.) minimum to 1.0 mm (0.039 in.) maximum measured between the top part of the oblong housing and the locking stud.

NOTE : Short rods of respectively 0.5 mm (0.020 in.) and 1.0 mm (0.039 in.) diameter can be used to measure this gap.

4 If these conditions are not obtained, adjust RAT extension jack as follows :
(Ref. Fig. 506, 507)

- Cut and remove lockwire and loosen locknut (9) with wrench WAS35287 or AGE14885 on jack outer body.
- Disconnect the ejection jack eye-end (1) from the fork (2) :
  . Remove the cotter pin (5) securing the nut (4), and remove and retain the nut (4) and washers (3).
  . Remove the hinge bolt (6) attaching the ejection jack eye-end (1).
- Disengage the ejection jack eye-end (1) from the fork (2) and install tool WAS35286 or AGE14884 over the adjustment nut (8) of the jack.
- Screw in or out adjustment nut (8) with wrench WAS35286 or AGE14884 until the gap of 0.5 mm (0.020 in.) minimum to 1.0 mm (0.039 in.) maximum measured between the top part of the oblong housing and the locking stud is obtained.

  NOTE : Do not alter adjustment of piston rod eye end fitting (7).
- Engage the ejection jack eye-end (1) on the fork (2).
- Connect the ejection jack eye-end (1) to the fork (2) :
  . Install the washers (3), hinge bolt (6) and nut (4). TORQUE nut to between 2.8 and 4.5 m.daN (20.7 and 33.2 lbf.ft).
  . Install the cotter pin (5).

5 When proper adjustment is obtained, TORQUE locknut (9) to between 25.7 and 28 lbf. ft. (3.5 and 3.8 m.daN) and safety with lockwire.

6 Retract RAT and check for proper locking.

7 Release the two locking pins located on RAT fork.

8 Disengage door hold-open latches and raise doors in order ensuring correct overlap. During this configuration visually check that locking pins freely engage in rocker arms.

9 In this configuration, the RAT stowage compartment doors must be in contact with wing lower surface skin.
If necessary adjust length of links until this result is obtained.
(Ref. Fig. 508)

a Make certain that RAT extension area is clear then extend RAT (Ref. 29-25-00, P. Block 301).

b From door, remove cotter pin (44) and loosen nut (45) attaching rod end fitting (43) to door fork fitting. Retain bolt (47), washer (46) and nut (45). Discard cotter pin (44).

c Bend tabs of keylock washer (42) away from nut (41).

d Loosen nut (41) and adjust length of link by screwing in or out adjusted rod and fitting (43).

e Adjustment performed, tighten nut (1) against rod end fitting (43) and fold back tabs of keylock washer (42) to secure nut (41).

f Position rod end fitting (43) in door fork fitting, install bolt (47), washer (46) and nut (45).

NOTE : Make certain that bushes (48) are still installed on door fork fitting. If necessary, install them.

g Tighten nut (45) and install cotter pin (44).

h Retract RAT (Ref. 29-25-00, P. Block 301).

10 Make certain that RAT extension area is clear.

11 Extend RAT (Ref. 29-25-00, P. Block 301) then check the following :
- uplock is released, RAT extends and locks in extended position
- doors open then lock at end of travel

12 Retract RAT to uplocked position (Ref. 29-25-00, P. Block 301) Close doors.

(d)Adjustment of RAT extension unlocking angle.
(Ref. Fig. 510)

1 Install the graduated scale 98A29203000000.

2 Install rigging pin 98A29201001000 to make certain that lever is at 0° and quadrant correctly graduated.

3 Remove rigging pin 98A29201001000 to perform the test.

4 Close the locking hook before attaching the weight.

5 In order not to damage the RAT, install an adjustable strap capable to support a weight higher than the weight mentioned below. This strap will be equipped with hooks at the ends. The strap length will depend on the height between the platform and the uplock unit hook. In all cases and for safety reasons, it is recommended to hang a single weight of 50 Kg (110.231 lb) to the strap end hook. The other hook will be placed at the uplock unit side.

CAUTION : - THIS WEIGHT WILL BE LIFTED ONLY A FEW CENTIMETERS FROM THE PLATFORM TO AVOID ANY ACCIDENT.
- TAKE ALL NECESSARY PRECAUTIONS TO PREVENT ANY DAMAGE BY THE STRAP HOOK AT UPLOCK UNIT SIDE DURING UNLOCKING OF UPLOCK UNIT HOOK.

6 Hang a 50 Kg (110.231 lb) weight to the locking hook.

WARNING : THE OPERATION OF THE UPLOCK UNIT MAY CAUSE THE 50 Kg (110.231 lb) LOAD TO FALL. ENSURE ADEQUATE PRECAUTIONS TO PREVENT INJURY TO PERSONNEL.

7 Rotate the control lever and check the angle value at which the unlocking occurs.

a If the unlocking angle is greater than 5°, no more action is necessary.

b If the unlocking angle is less than 5° :
- Remove the uplock unit (Ref. 29-25-26, P. Block 401).
- Install and perform test of the new uplock unit (Ref. 29-25-26, P. Block 401).
An alternative rigging procedure can be applied if no spare is available.
Install rigging pin 98A29201001000 in cable quadrant.

Remove lockwire, adjust the length of the rod.
Put the lever in the negative range to achieve an unlocking angle greater than 5 degrees. Remove the rigging pin and verify the unlocking angle by action on the control handle.
Wirelock the ends of the rod. Remove the uplock unit at the next check and adjust the rod length after rigging.

8 Remove the 50 Kg (110.231 lb) weight and the strap.

9 Remove the graduated scale 98A29203000000.

(e)Adjustment of mechanical control (FR47 to FR50).
(Ref. Fig. 509)

1 Adjustable rod installation

a If RAT is not extended, manually extend RAT by acting on uplock unit actuating lever. Make certain that RAT is downlocked.

b Insert rigging pin 98A29201001000 in cable quadrant at FR47 and rigging pin 98A2920100000 on uplock unit actuating lever.

c At both ends of link rod
- Cut and remove lockwire if necessary and loosen locknuts (56)
- Make certain that eye bolts (54) are engaged in rod (58) by equal amounts.
- Turn rod body (58) in order to obtain the correct length for rod installation.

d Position rod eye bolts (54), from one side on uplock unit actuating lever and from other side on cable quadrant at FR47 and install bolts (55).
NOTE : Make certain that bushes are still installed on fork fittings. If necessary install them.

e If necessary, readjust rod length by turning rod body for installation of bolts (55). TORQUE locknuts (56) to 52.2 lbf. in. (0.59 m.daN) and safety on lockwashers (57) with lockwire.

f On each side of rod, on bolt (55), install washer (53), nut (52). Tighten nut (52) and safety with cotter pin (51).

g At both ends of rod, check through witness hole (59) that eye bolt (54) is visible.

h Remove all rigging pins from control linkage.

j Retract RAT (Ref. 29-25-00, P. Block 301).
(Ref. Fig. 503)

k Unlock and pull control handle.
Make certain that a 0 + 0.8 mm (0 + 0.0315 in.) gap exists between uplock unit actuating lever and end-of-travel stop.

l If this gap is not achieved, adjust adjustable bellcrank and length of rod to obtain the required value.

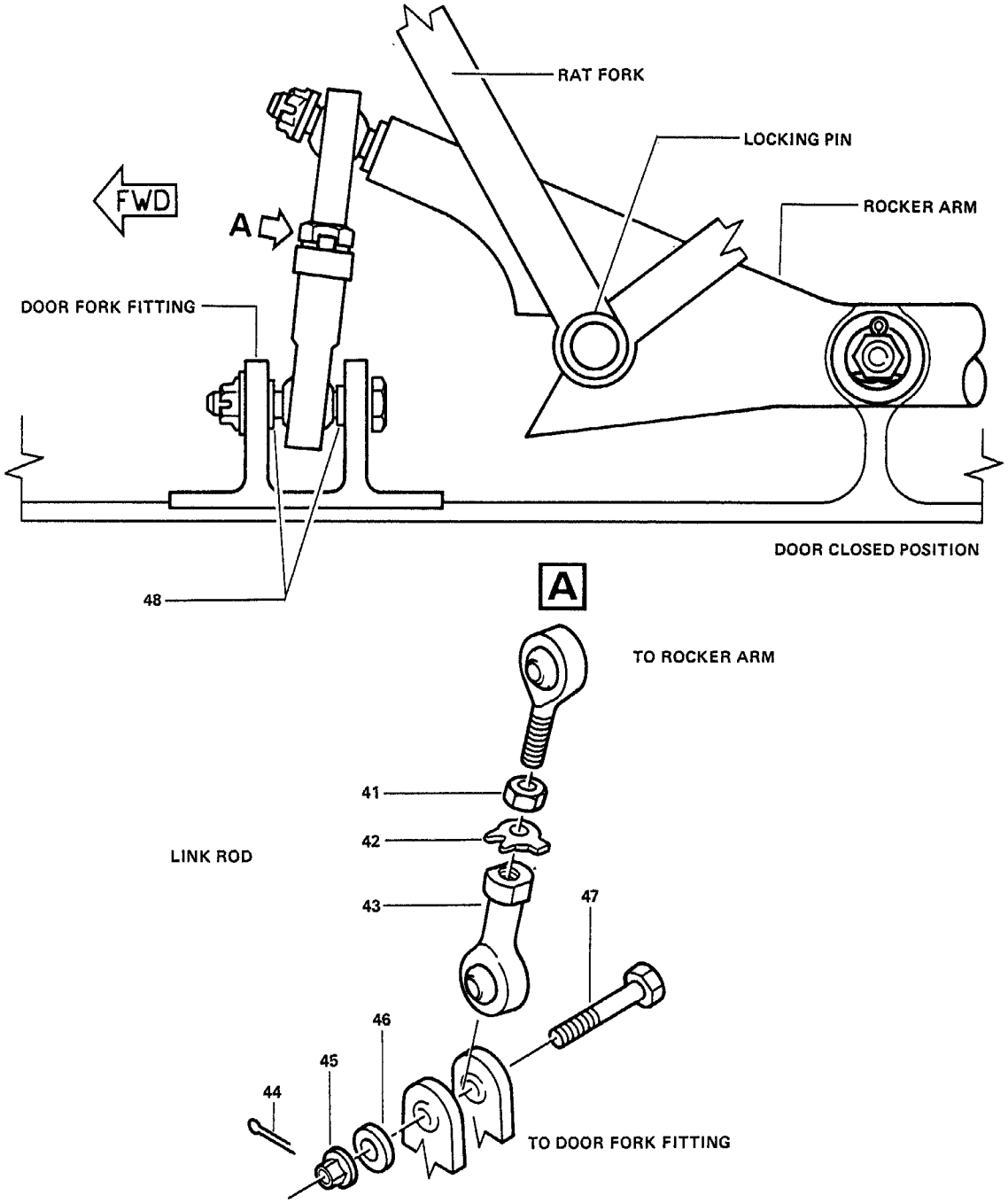
m Lock and safety adjustable bellcrank and rod ends with lockwire.

n Push control handle into its housing and check that, at FR10, under return spring action (without additional action) the cable quadrant comes into contact with the two bellcranks on which the flexible cable control is connected.

p Perform same checks for other control handle.

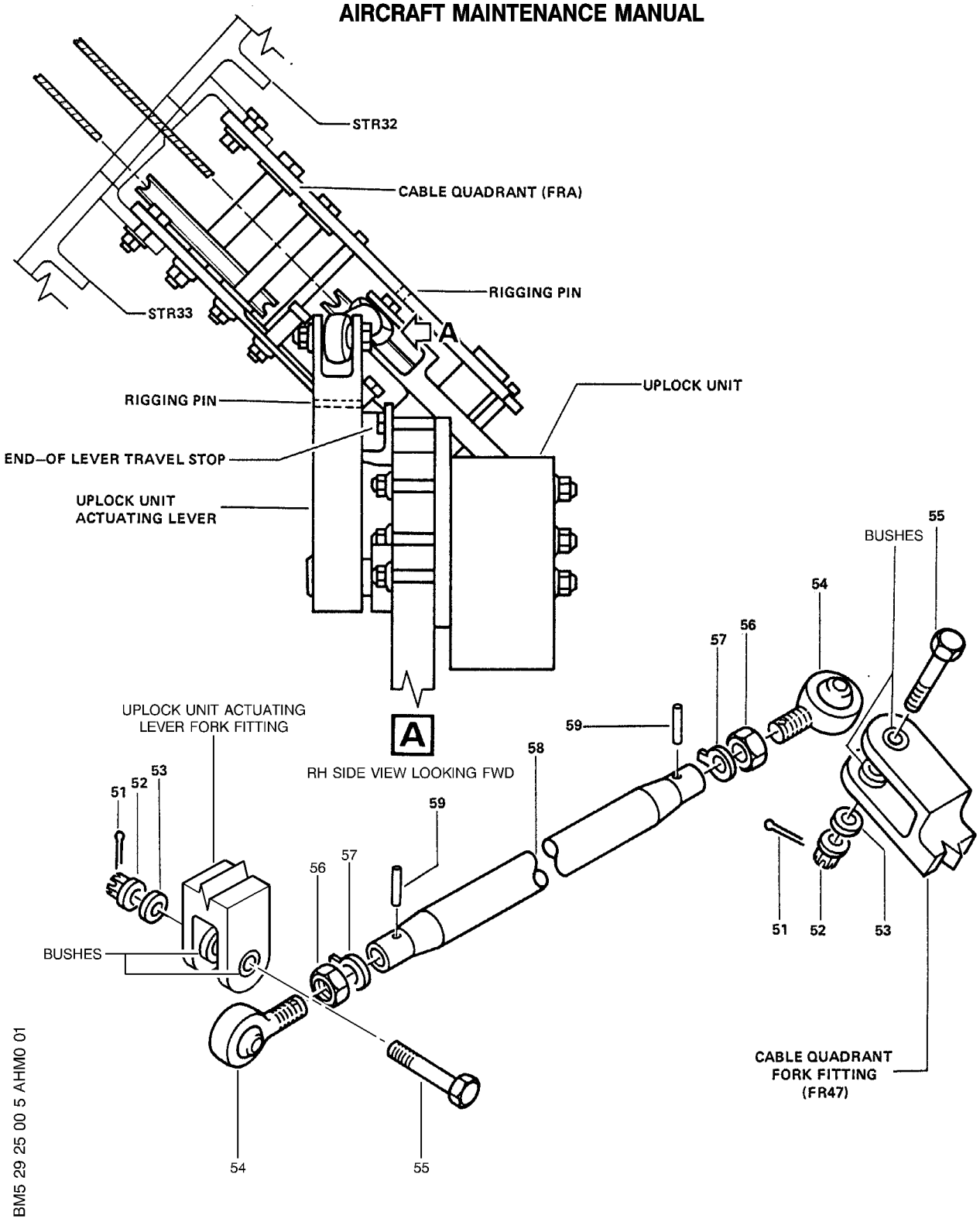
(g)Adjustment of bladelock plunger
(Ref. Fig. 511)

1 Rotate turbine assembly to align arrows on turbine assembly and

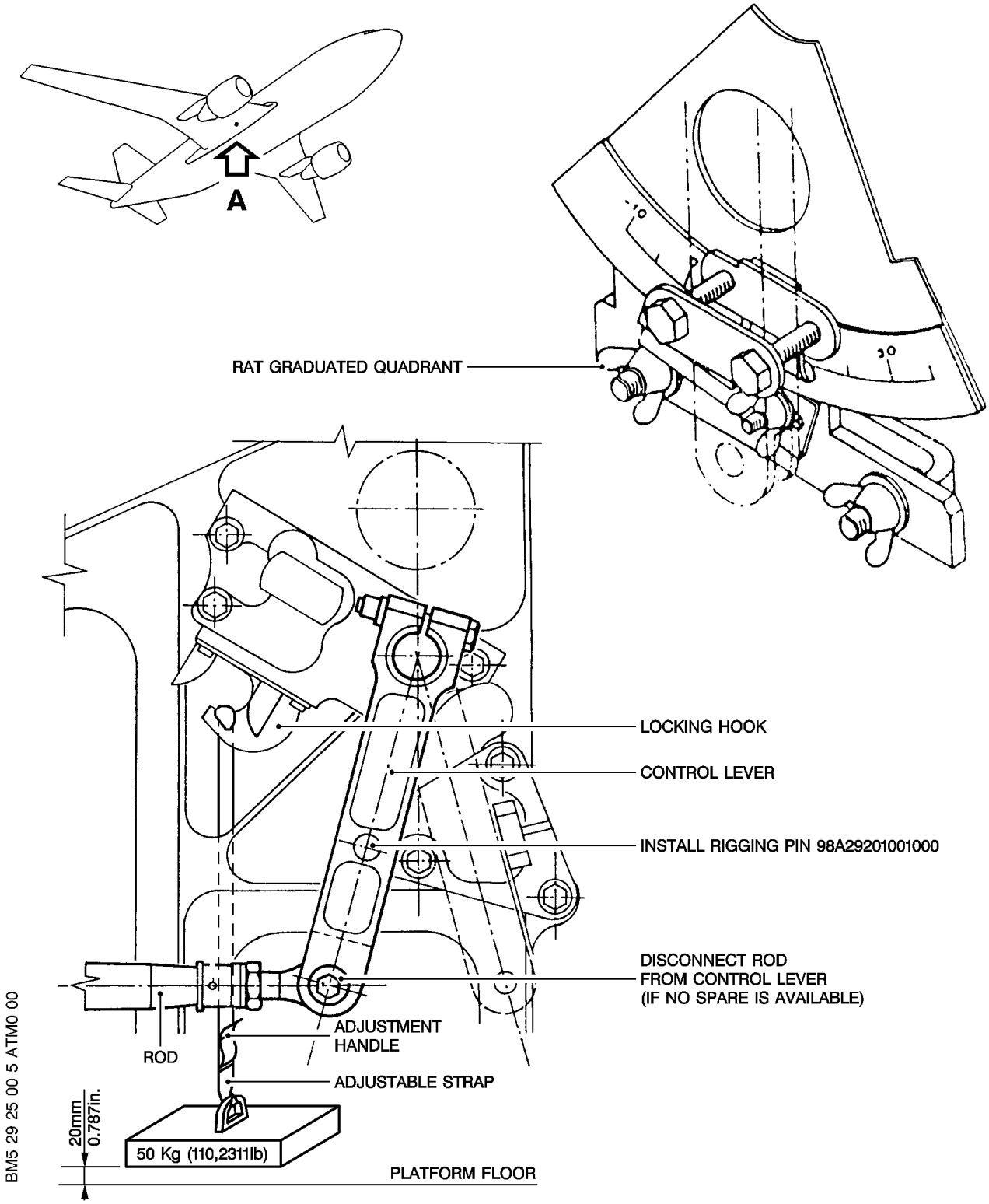


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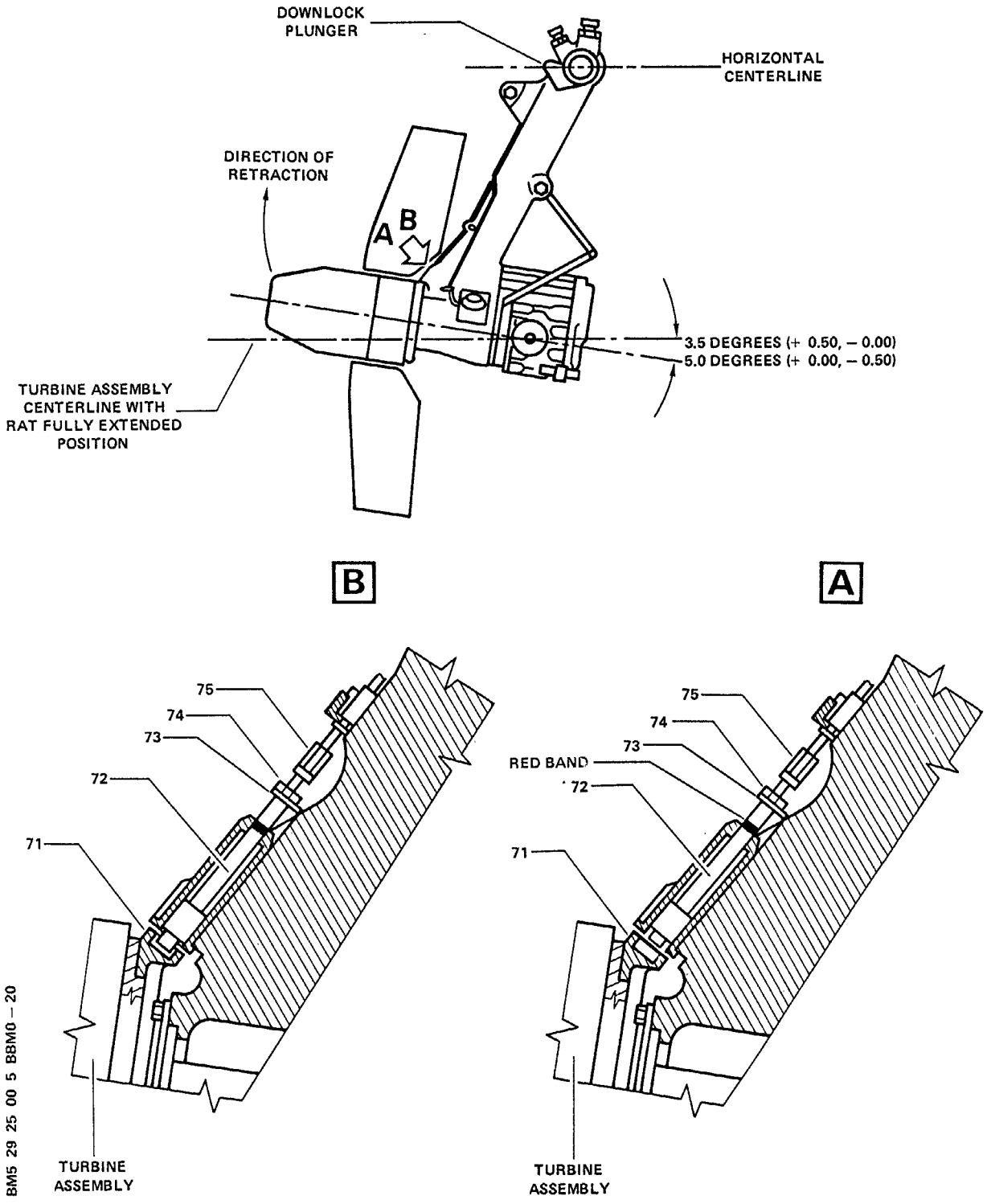
Door Link Rod - Adjustment
Figure 508



Adjustable Rod Installation
Figure 509



Check of RAT Extension Unlocking Angle
Figure 510



Bladelock Plunger - Adjustment
Figure 511

strut.

2 Bend tabs of keylock washer (73) away from nut (74).

3 Retract down lock plunger installed at upper section of RAT strut housing.

4 Elevate RAT to 3.5 degrees (+ 0.50, - 0.00 degree) from fully extended position.

CAUTION : DO NOT GRASP RAT BY TURBINE ASSEMBLY COVER OR TURBINE BLADES WHEN RAISING THE RAT.

5 Loosen nut (74) and adjust calbe (75) so that end of plunger (72) just clears lock collar (71) (Ref. Detail A).

6 Tighten nut (74).

7 Lower RAT to fully extended position.

8 Retract downlock plunger and carry out retraction of RAT to 3.5 degrees (+ 0.50, - 0.00 degree) from fully extended position and check that :
- plunger (72) just clears lock collar (71)
- blades rotate freely.

9 Continue to perform retraction of RAT up to 5.00 degrees (+ 0.00, - 0.50 degree) from fully extended position and check that (Ref. Detail B) :
- plunger (72) just engaged in lock collar (71)
- blades cannot rotate.

NOTE : The plunger should be engaged in the lock collar to a depth that will prevent turbine assembly rotation when a force of 5.0 lbf. ft maximum is applied by hand. The red band on the plunger must be visible.

NOTE : With RAT elevated over 15 degrees and plunger fully engaged in lock collar, turbine assembly must not rotate and red band on plunger must not be visible.

10 Return RAT to fully extend position.

11 Rotate turbine assembly 180 degrees by hand so that plunger (72) is aligned with second slot in lock collar (71) and check that steps 8 and 9 are fulfilled.

12 TORQUE nut (74) against plunger (72) to between 29 and 32 lbf. in. (0.324 and 0.358 m.daN).

13 Fold back tabs of keylock washer (73) to secure nut (74).

2. Functional Test

A. Reason for the Job
(1)Checking of RAT operation

B. Equipment and Materials

ITEM	DESIGNATION
1. 97A29002500000	Protective Equipment - Ram Air Turbine
2. T1351960100000	Test Set - Ram Air Turbine
or	
731436	Ground Test Unit
3.	Access Platform 2.6 m (8 ft. 8 in.)
R 4.	Protective Barriers
5.	Lockwire
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-37, P. Block 401	Turbine Assembly - Removal/Installation
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(1)Job set-up
(a)Initial conditions
1 Circuit breakers associated with RAT, 1GF closed.
2 In flight compartment, make certain that landing gear control lever is in DOWN position.
(b)Make certain that forward services ventilation system is in operation.
(c)Open access door to Yellow (671DB) ground connectors.
R (d)Access to electrical connector 142VC
R WARNING : MAKE SURE THAT PROTECTIVE EQUIPMENT IS STABLE AND CANNOT
R MOVE DURING TEST.
R IF PROTECTIVE EQUIPMENT MOVES, THERE IS RISK THAT :
R - IT WILL TOUCH AND CAUSE DAMAGE TO RAT.
R - BROKEN PARTS WILL CAUSE INJURY TO PERSONS.
R 1 In zone 144, open door 144DR for access to electrical connector
R 142VC.
(e)Install RAT protective equipment 97A29002500000 on wing lower surface in RAT extension area.
(f)Connect hydraulic ground power cart to Yellow system ground connectors.
NOTE : Hydraulic ground power cart minimum flow rate must be 70 l/mn with all Yellow system servo control selector valves closed.
(g)Open right main landing gear door (Ref. 32-12-11, P. Block 301).
(h)Make certain that level of fluid in Yellow hydraulic reservoir

is correct.

(j)Partially depressurize Yellow reservoir to 18 psi (1.2 bar).

WARNING : BEFORE EXTENDING RAT, MAKE CERTAIN THAT RAT EXTENSION AREA IS FREE FROM PERSONNEL AND EQUIPMENT. INSTALL SAFETY BARRIER TO KEEP PERSONNEL AWAY FROM RAT OPERATING AREA. DO NOT STAND DIRECTLY AFT OF RAT OR IN ITS EXTENSION ARC WHILE DEPLOYING.

WARNING : WEAR HEARING PROTECTORS WHEN PERFORMING BACKDRIVE CHECK OF THE RAT.

(k)Make certain that RAT extension area is clear of personnel and of miscellaneous items of equipment.

R (l)Install protective barriers around work area.

R (m)In flight compartment, extend RAT by pulling one of the two control handles.

1 Check :
- Control handle locking is extended and locked.
- RAT uplock release, extension and locking in extended position.
- RAT rigging (Ref. Para. 1.C.(2)(c)).
- Doors opening then locking at end of travel.
- Push control handle into its housing.

2 Check the correct operation of second RAT control handle and flexible cable control as follows :
- Pull the second RAT control handle and place it in extended position.
- Make certain that control handle can be operated by hand and locked.
- Push control handle in its housing.

WARNING : AFTER THE RAT HANDLES ARE RETURNED TO THEIR HOUSING, CHECK THAT THE CABLE QUADRANT BELLCRANK ASSIES ARE ON THEIR MECHANICAL STOPS.

WARNING : AFTER EXTENDING RAT MAKE SURE THAT RAT IS LOCKED IN EXTENDED POSITION AND THE DOORS ARE LOCKED AT THE END OF TRAVEL.

R (n)Do the manual blade (governor) twist test.

1 Manually turn both RAT blades carefully to the fine-pitch stop position (twisting range approx. 51 degrees) against the spring pressure, grasping each blade near the blade root. Quickly release the blades and let the spring pressure push the blades to the coarse-pitch position. Do this action three times and make sure that the blades go back to the hard stop at the full coarse-pitch position.

2 Replace the turbine assembly if the blades do not touch the hard stop at the full coarse-pitch position (Ref. 29-25-37, P. Block 401).

R (p)Connect plug connector of ground test equipment 731436 or T1351960100000

R (q)On ground test unit make certain that power supply switch is in OFF position and that PUMP/SPIN switch is in PUMP position.

R (r)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R (s)In flight compartment on panel 428VU, release SERVO CTL/Y pushbutton switch.
- OFF legend comes on. Check that SERVO CTL/B and G pushbutton

switches are pressed (in).

R (t) In flight compartment, make certain that aircraft is in the following configuration.

1 On panel 427VU :

- PTU pushbutton switches released (out), ON legends off
- ELEC PUMPS pushbutton switch released (out), ON and LO PR legends off
- PUMP ENG1 and 2 pushbutton switches released (out), OFF legends on.

(2) Test with ground test unit 731436

(a) Start up hydraulic ground power cart and stabilize pressure at 3000 psi (206 bars) at Yellow system ground connector.

(b) On ground test unit 731436 place power supply switch in ON position
- witness light comes on

(c) On ground test unit 731436 place PUMP/SPIN switch in SPIN position (switch spring-loaded in PUMP position).
- GOVERNED indicator light comes on.

CAUTION : RELEASE GROUND CHECKOUT MODULE SOLENOID VALVE SPIN SWITCH QUICKLY TO PREVENT DAMAGE TO EQUIPMENT IF GROUND TEST UNIT RED OVERSPEED LIGHT COMES ON.

(d) If ground test unit red OVERSPEED light comes on, the governor is not operating properly and turbine assembly must be replaced.

(e) If neither ground test unit light comes on, press ground test unit button marked LAMP TEST. If lights do not come on, a bulb is defective and another ground test unit must be used.

(f) On ground test unit 731436, place PUMP/SPIN switch in PUMP position.
- OIL PRESSURE indicator display turns white. This corresponds to a pressure of 2250 ± 250 psi (155 ± 17 bars).

NOTE : Proper hydraulic pump pressure indication will make certain that the RAT and ground checkout module have returned to their normal operating mode.

(g) Check RAT ground checkout module for hydraulic fluid leaks. If excessive hydraulic fluid leaks are present, replace defective unit.

(h) On ground test unit 731436 place power supply switch in OFF position.

(3) Test with test set T1351960100000

(a) Start up hydraulic ground power cart and stabilize pressure at 3000 psi (206 bars) at Yellow system ground connector.

(b) On test set T1351960100000, place power supply switch in ON position.
- witness light comes on.

(c) On test set T1351960100000, place PUMP/SPIN switch in SPIN position. (spring - loaded switch in PUMP position).
- on revolution counter, indicated speed must be between 4100 and 4600 rpm.

(d) On test set T1351960100000, place PUMP/SPIN switch in PUMP position.
- OIL PRESSURE indicator light comes on. This corresponds to a pressure of 2250 ± 250 psi (155 ± 17 bars).

(e) On test set T1351960100000, place power supply switch in OFF position.

(4) Check ejection jack fluid level (Ref. 12-12-29, P. Block 1).

(5) Close-up

(a) On panel 428VU, release SERVO CTL/Y pushbutton switch

- OFF legend goes off.

(b) Shut down and disconnect hydraulic ground power cart. Close access door 671DB.

(c) In zone 144, disconnect ground test equipment, close access door.

(d) In zone 671, check for leaks on ground check out module and on RAT. Check that fluid in Yellow reservoir is still at the same level. If required, top up reservoir (Ref. 12-12-29, P. Block 001).

(e) Remove RAT protective equipment.

(f) Retract RAT (Ref. 29-25-00, P. Block 301).

NOTE : In flight compartment, make certain that both RAT control handles are lead sealed.

(g) Pressurize hydraulic system reservoirs (Ref. 29-14-00, P. Block 301).

(h) Remove all ground handling equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

R **WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS ARE IN POSITION.**
POSITION SAFETY BARRIERS AND DISPLAY WARNING NOTICES AROUND RAT EXTENSION AREA.
MAKE CERTAIN NO PERSONNEL IS WITHIN RAT EXTENSION AREA.

1. Inspection of the Uplock Hook

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Mirror
(2)	Torch Light
(3)	Emery Cloth, Quality 6001120
(4)	Honing Store, Quality 6001120
(5)98A29201000000	Pin-Rigging, RAT Drop Out Controls
(6)Material No. 04-004A	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)

B. Procedure

(1)Extend RAT (Ref. 29-25-00, P. Block 301).

If RAT fails to extend :

CAUTION : INSTALL SAFETY PIN 98A29201000000 IN UPLOCK INPUT LEVER FROM FORWARD END OF RIGHT MAIN LANDING GEAR WELL.
MAKE CERTAIN THAT RAT EJECTION AREA IS COMPLETELY CLEAR.

(a)Open RAT compartment doors.

1 Gain access to RAT from forward end of right main landing gear well, retract and lock plungers.

2 Doors are free and fall open.

3 Grip the blades and check for correct locking. If locking is not correct, align blades with A/C center line.

4 remove safety pin 98A29201000000.

(b)Ejection of RAT (Ref. 29-25-00, P. Block 301).

1 Apply an upward force on RAT by means of a large wooden block (removing load from hook will free hook).

(2)Inspection of Uplock Hook

Using a mirror and torch light, carefully inspect hook contact area and detect all traces of indentation.

(a)If no defect is evidenced, inspection of hook is completed.

(b)If a trace of indentation is evidenced

1 Eliminate defect by means of fine emery cloth until indentation is no longer felt when moving finger nail over marked area.

NOTE : Polishing movement on hook must be back and forth (lateral movement would increase indentation).

2 Hook must be carefully cleared after rectification to remove all debris.
3 Visually confirm using mirror and torch light.
(3)Not Applicable

C. Test
(1)Retract and eject RAT (Ref.29-25-00, P. Block 301) to confirm its connect operation.

D. Close-Up
(1)Retract RAT (Ref 29-25-00, P. Block 301).
(2)Remove all ground handling and maintenance equipment, standard and special tools together with ground support and replenishing equipment, all access equipment and miscellaneous items.

**ON A/C ALL

Post SB 29-2076 For A/C ALL

Post SB 29-2077 For A/C ALL

2. Inspection of the Lever Assembly

A. Equipment and Materials

ITEM	DESIGNATION
(1)Material No. 04-004	Common Greases (Ref. 20-31-00)
(2)Material No. 15-008	Corrosion Protective (Ref. 20-31-00)
Referenced Procedures	
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-26, P. Block 401	Ram Air Turbine Uplock Mechanism

B. Job Set-Up
WARNING : INSTALL SAFETY BARRIER TO KEEP PERSONNEL AWAY FROM RAT OPERATING AREA.
WARNING : BEFORE EXTENDING RAT, MAKE CERTAIN THAT RAT EXTENSION AREA IS FREE FROM PERSONNEL AND EQUIPMENT. DO NOT STAND DIRECTLY BEHIND RAT OR IN ITS EXTENSION ARC WHILE DEPLOYING.
WARNING : BECAUSE OF THE POSSIBILITY OF ACCIDENTAL EXTENSION NO SERVICING OR MAINTENANCE IS TO BE PERFORMED ON RAT WHILE STOWED.
(1)Install protective barriers around work area.
(2)Prohibit opening of right main gear main door.
(3)Position access platform at zone 671.
(4)Extend RAT (Ref. 29-25-00, P. Block 301).
(5)Open access door 671BB.

**ON A/C ALL

2. Not Applicable

**ON A/C ALL

Post SB 29-2076 For A/C ALL

R Post SB 29-2077 For A/C ALL

(Ref. Fig. 601)

**ON A/C ALL

Post SB 29-2076 For A/C ALL

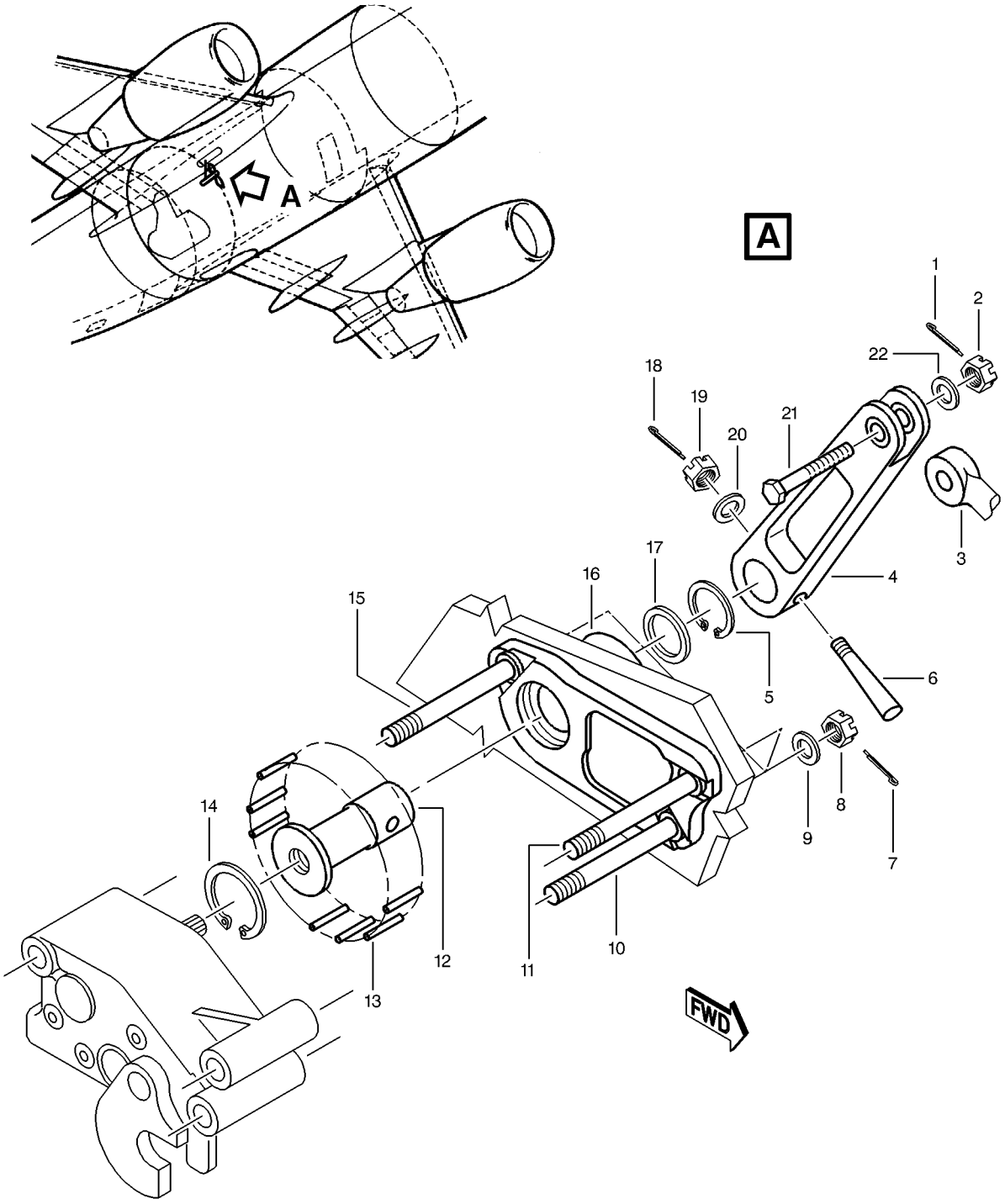
R Post SB 29-2077 For A/C ALL

C. Removal of Lever Assembly
(1)Remove lever (4).
(a)Remove and discard cotter pin (1).
(b)Remove nut (2) and washer (22).
(c)Remove bolt (21) and disengage rod (3).
(d)Remove and discard cotter pin (18).
(e)Remove nut (19) and washer (20).
(f)Remove taper pin (6) and remove lever (4).
(2)Remove uplock mechanism (Ref. 29-25-26, P. Block 401).
(3)Remove back plate (16).
(a)Remove cotter pins (7) from the three nuts (8). Discard cotter pins (7).
(b)Remove the three nuts (8) and the three washers (9).
(c)Remove studs (10), (11) and (15).
(4)Disassemble back plate (16).
(a)Remove retainer pins (14) and (5). Remove washer (17).
(b)Remove control shaft (15). Remove needles (13).

**ON A/C ALL

Post SB 29-2076 For A/C ALL

R Post SB 29-2077 For A/C ALL



BM5 29 25 00 6 BAM0 00

Ram Air Turbine Uplock Unit
Figure 601

R

D. Inspection of Lever Assembly
(1)Clean and visually inspect for corrosion on control shaft (12), needles (13), retainer rings (5) and (14), washer (17), lever (4), back plate (16).

**ON A/C ALL

Post SB 29-2076 For A/C ALL

R Post SB 29-2077 For A/C ALL

NOTE : If corrosion is found, replace corroded parts by new parts. However, installation of corroded parts is temporarily possible, but thin parts must be replaced within 12 months.

**ON A/C ALL

Post SB 29-2076 For A/C ALL

R Post SB 29-2077 For A/C ALL

E. Installation of Lever Assembly
(1)Assemble back plate (16).
(a)Apply material 04-004 on control shaft (12), needles (13), back plate (16).
(b)Install control shaft (12), needles (13), washer (17), retainer rings (5) and (14) on back plate (16).

**ON A/C ALL

Post SB 29-2076 For A/C ALL

R Post SB 29-2077 For A/C ALL

NOTE 1 : During installation, fill areas between needles with material 04-004.
NOTE 2 : After installation, fill areas between control shaft and back plate with material 15-008.

**ON A/C ALL

Post SB 29-2076 For A/C ALL

R Post SB 29-2077 For A/C ALL

(2)Install back plate (16).
(a)Install the three studs (10), (11) and (15).
(b)Install the three washers (9).
(c)Install and tighten the three nuts (8). Safety with cotter pins (7).
(3)Install uplock mechanism (Ref. 29-25-26, P. Block 401).
NOTE : Do not perform adjustment of uplock mechanism at this level, lever assy must be installed beforehand.
(4)Install lever (4).
(a)Install taper pin (6).
(b)Install washer (20).
(c)Install and tighten nut (19). Safety with cotter pin (18).
(d)Position rod (3) on lever (4).
(e)Install bolt (21).
(f)Install washer (22).
(g)Install and tighten nut (2). Safety with cotter pin (1).

**ON A/C ALL

Post SB 29-2076 For A/C ALL

R Post SB 29-2077 For A/C ALL

F. Test
(1)In flight compartment, extend RAT by pulling one of the two control handles.
(2)Perform adjustment of uplock unit (Ref. 29-25-00, P. Block 501, para. 1.C.(2)(c), items 1 and 2).
(3)Make certain that RAT is correctly extended and locked.
(4)Make certain that doors are open and correctly locked.
(5)Make certain that RAT control handles remain in pulled position.
(6)Perform RAT retraction/extension test (Ref. 29-25-00, P. Block 301).

G. Close-Up
(1)Retract RAT, close doors (Ref. 29-25-00, P. Block 301).
(2)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(3)Remove warning notices.

**ON A/C ALL

3. General Visual Inspection of Control Cables

A. Reason for the Job
Visual inspection of the RAT control cable circuit.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A49601000000	Pin-Rigging, Ram Air Turbine Controls
Referenced Procedures	
- 20-29-11, P. Block 1	Cable Installation
- 20-29-12, P. Block 1	Control Cable Check
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-14, P. Block 401	Flexible Control - RAT
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 53-10-23, P. Block 401	Panels - Passenger Compartment

C. Procedure

(1)Job set-up

(a)Extend RAT (Ref. 29-25-00, P. Block 301).

(b)At STA972/FR10, insert rigging pin 98A49601000000 in RAT control quadrant.

NOTE : Make certain that, in flight compartment, the RAT control handles are in OFF position.

(c)Open FWD cargo compartment door (Ref. 52-30-00, P. Block 1).

R (d)Remove ceiling panels :

R 132AC, 132BC, 132CC, 132DC, 132EC, 132FC and 132GC.

(e)In flight compartment, remove linings :
211EX and 212EX.

(f)In passenger compartment, remove center floor panels :
242AG, 242BG, 242CG, and 242UF (Ref. 53-10-23, P. Block 401).

(2)Inspection

(a)Do a visual inspection of the flexible control cables :

1 Inspect flexible control cables for signs of overtension or braid wear.
If necessary replace the flexible control cables (Ref. 29-25-14, P. Block 401).

2 Check the screws of the flexible control cables, make certain that they are tight and lockwired.

3 if an adjustment of the flexible control cables is required, (Ref. 29-25-00, P. Block 501).

4 Make certain that cables are correctly routed and clamped (Ref. 29-25-00, P. Block 501).

(b)Do a visual inspection of the RAT control cable circuit :

1 Make certain that the cables do not have kinks, broken wires or too much wear (Ref. 20-29-12, P. Block 1).

2 If there is damage, replace the related cable (Ref. 20-29-11, P. Block 1).

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R (b)In FWD cargo compartment, install ceiling panels :

R 132AC, 132BC, 132CC, 132DC, 132EC, 132FC and 132GC.

R (c)Close FWD cargo compartment door (Ref. 52-30-00, P. Block 1).

(d)In flight compartment, install linings :
211EX and 212EX.
(e)In passenger compartment, install center floor panels :
242AG, 242BG, 242CG, and 242UF (Ref. 53-10-23, P. Block 401).
(f)Remove rigging pin P/N 98A49601000000 from quadrant at STA972/FR10.
(g)Retract RAT and close doors (Ref. 29-25-00, P. Block 301).
(h)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

R 4. Visual Inspection of Control Linkage for Corrosion and Damage

A. Reason for the Job

R The purpose of this procedure is to do a visual inspection of control
R linkage for corrosion and damage.

B. Equipment and material

ITEM	DESIGNATION
A.	Safety barriers
B.	Access platform, 2.6 m (8 ft. 8 in.)
C.	Warning notices
D.	Clean and soft brush
E. Material No. 04-004	Common greases (Ref. 20-31-00)
F. Material No. 05-005D	Storage preservation (Ref. 20-31-00)
G. Material No. 11-026	Cleaning agents (Ref. 20-31-00)
Referenced Procedures	
- 24-42-00, P. Block 301	Ground Service Bus Control
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)

C. Procedure

(1)Job set-up

WARNING : BEFORE EXTENDING RAT, MAKE CERTAIN THAT RAT EXTENSION AREA IS FREE FROM PERSONNEL AND EQUIPMENT. DO NOT STAND DIRECTLY AFTER RAT OR IN ITS EXTENSION ARC WHILE DEPLOYING.

WARNING : BECAUSE OF THE POSSIBILITY OF ACCIDENTAL EXTENSION NO SERVICING OR MAINTENANCE IS TO BE PERFORMED ON RAT WHILE STOWED.

(a)Energize the ground service network (Ref. 24-42-00, P. Block 301).

(b)Install safety barriers and display warning notices around RAT extension area.

(c)In flight compartment, extend RAT (Ref. 29-25-00, P. Block 301).

(d)Put an access platform in position in zone 671.

(2)General visual inspection of control linkage for corrosion and damage. (Ref. Fig. 602)

(a)Clean all linkage connecting parts with a clean and soft brush and material No. 11-026 (Ref. 20-31-00).

(b)Make sure that the door links (levers, rods...) are correctly attached to the doors and to the structure.

(c)Make sure that the door links and their related components are free from cracks, corrosion or other damage :
- bolts,
- nuts,
- springs.

(d)Make sure that the lockwire and the cotter pins are in correct condition.

(e)Make sure that the linkage bracket is correctly attached to the strut and to the housing.

(f)Make sure that the linkage bracket and its related components are free from cracks, corrosion or other damage :

- bolts,
- nuts,
- springs.

(g)Make sure that the lockwire and the cotter pins are in correct condition.

(h)Make sure that the retaining springs are correctly attached to the lever assies and to the structure.

(i)Make sure that the retaining springs and their related components are free from cracks, corrosion or other damage :
- bolts,
- nuts,
- springs.

(j)Make sure that the lockwire and the cotter pins are in correct condition.

(k)Apply Material No. 04-004 (Ref. 20-31-00) with a clean and soft brush on the lever assies and on their retaining parts.

(3)Close-up

(a)Remove the access platform from zone 671.

(b)Retract RAT (Ref. 29-25-00, P. Block 301).

(c)Remove safety barriers and warning notices around RAT extension area.

(d)De-energize the ground service network (Ref. 24-42-00, P. Block 301).

5. General Visual Inspection of the Exposed RAT Control Cables from Flight Compartment to Pressure Seals

A. Reason for the Job

The purpose of this procedure is to do a visual inspection of the exposed RAT control cables from flight compartment to pressure seals.

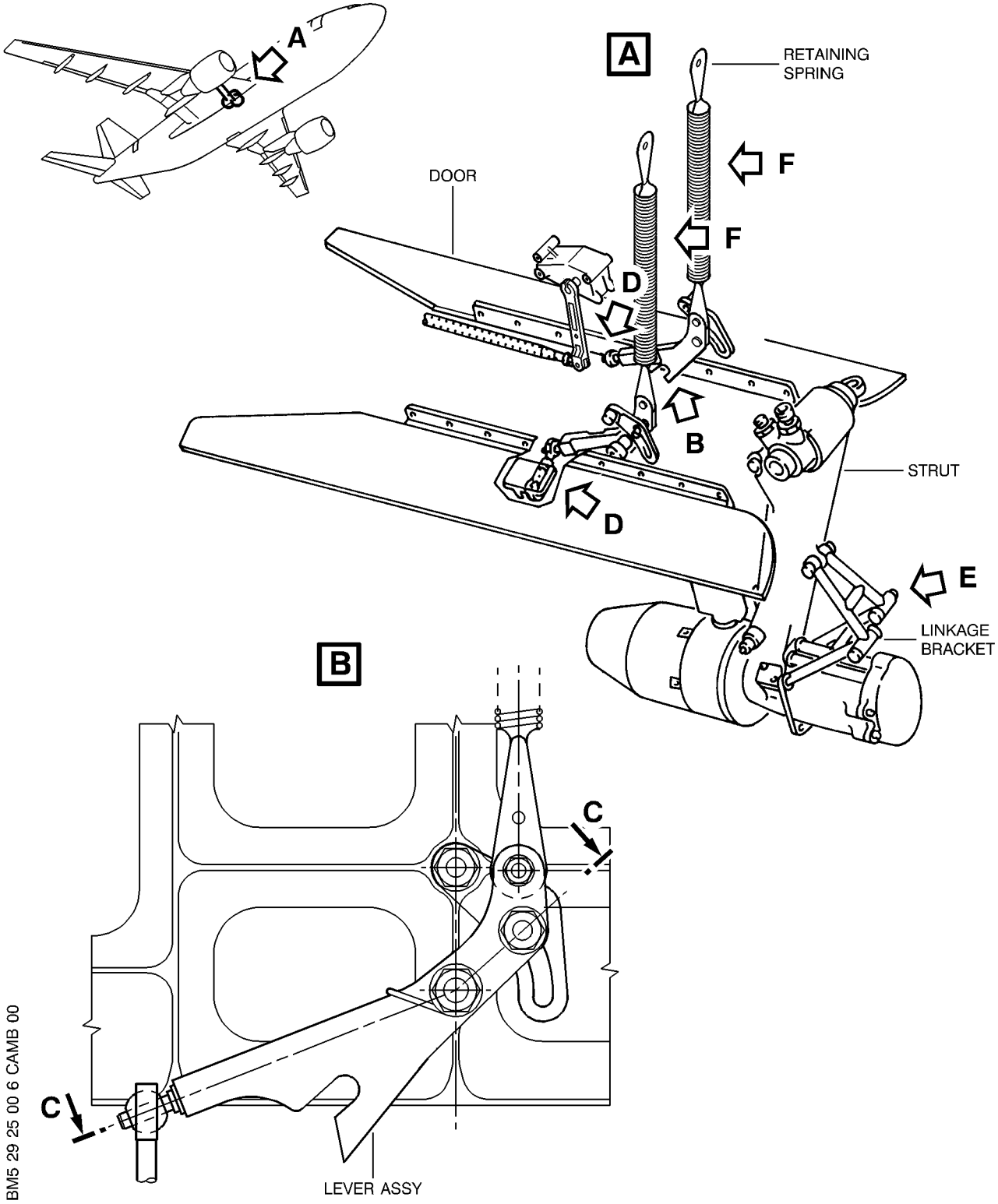
B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 20-29-11, P. Block 1	Cable Installation
- 20-29-12, P. Block 1	Control Cable Check
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-14, P. Block 401	Flexible Control - RAT
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 53-10-25, P. Block 401	Panels - Passenger Compartment

C. Procedure

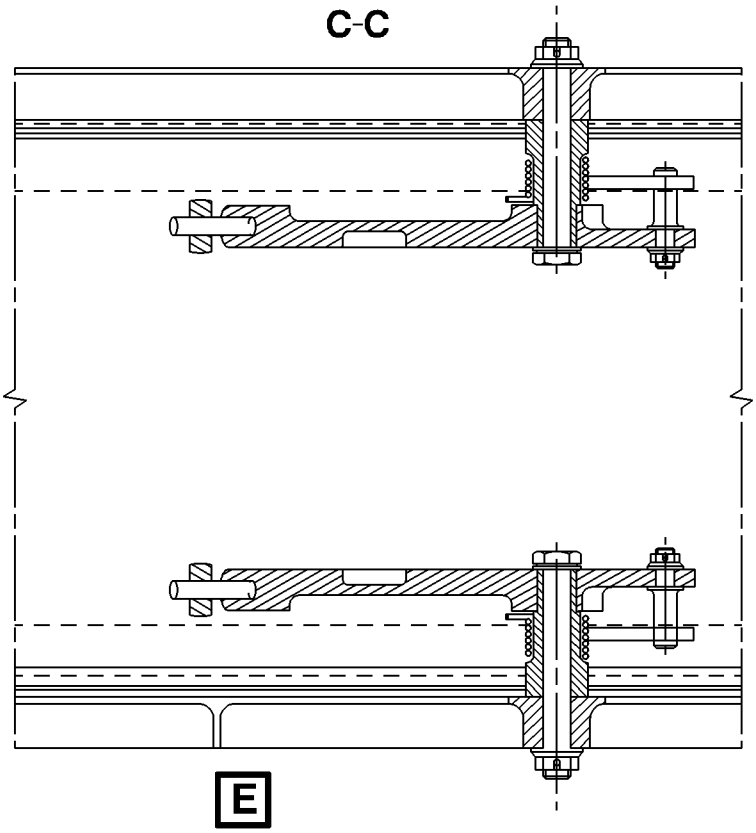
(1)Job set-up

R (a)Remove ceiling panels :
R 132AC, 132BC, 132CC, 132DC, 132EC, 132FC and 132GC.
R (b)In the flight compartment, remove linings :

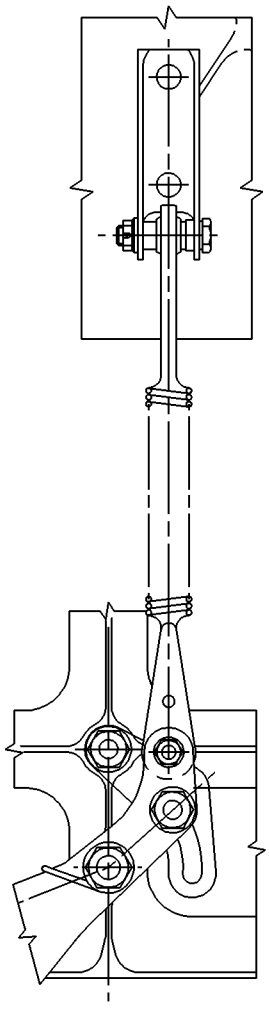


Control Linkage (Sheet 1/2)
Figure 602

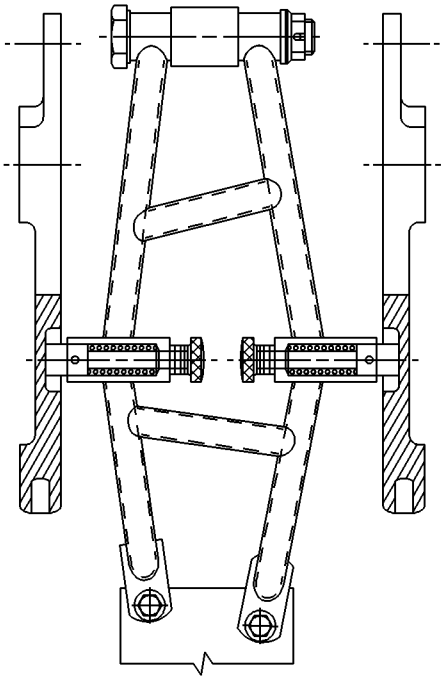
SECTION
C-C



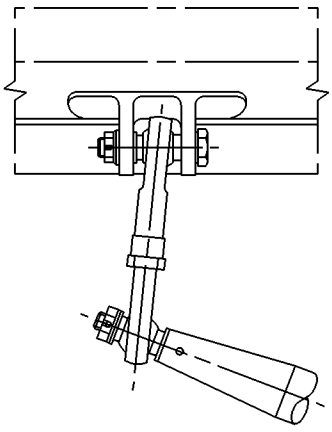
F



E



D



BM5 29 25 00 6 CAMK 00

Control Linkage (Sheet 2/2)
Figure 602

211EX and 212EX.

(c)In the passenger compartment, remove the panels :
242JF, 242KF, 242CG and 242RF (Ref. 53-10-25, P. Block 401).

(2)Inspection

(a)Do a visual inspection of the flexible control cables :

1 Inspect the flexible control cables for signs of overtension or braid wear. If necessary, replace the flexible control cables (Ref. 29-25-14, P. Block 401).

2 Check the screws of the flexible control cables, make certain that they are tight and lockwired.

3 If necessary, do an adjustment of the flexible control cables (Ref. 29-25-00, P. Block 501).

4 Make certain that the cables are correctly routed and clamped (Ref. 29-25-00, P. Block 501).

(b)Do a visual inspection of the RAT control cable circuit from the FWD control cable quadrant to pressure seals :

1 Make certain that the cables do not have kinks, broken wires or too much wear (Ref. 20-29-12, P. Block 1).

2 If there is damage, replace the related cable (Ref. 20-29-11, P. Block 1).

(3)Close-up

(a)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(b)In the passenger compartment, install the panels :
242JF, 242KF, 242CG and 242RF (Ref. 53-10-25, P. Block 401).

(c)In the flight compartment, install linings :
211EX and 212EX.

(d)In FWD cargo compartment, install ceiling panels :
132AC, 132BC, 132CC, 132DC, 132EC, 132FC and 132GC.

(c)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

R 5. Detailed Inspection of RAT Control Cable From Pressure Seals to
R Ram Air Turbine

R A. Reason for the job
R The purpose of this procedure is to do an inspection of RAT control cable
R from pressure seals to Ram Air Turbine.

R B. Equipment and materials

ITEM	DESIGNATION
(1)98A49601000000	Pin-Rigging, Ram Air Turbine Controls
(2)	Access platform 2.6m (8 ft. 8 in.)
Referenced Procedures	
- 20-29-11, P. Block 1	Cable Installation
- 20-29-12, P. Block 1	Control Cable Check
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)

ITEM	DESIGNATION
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
- 32-12-11, P. Block 301	Main Gear Main Door

C. Procedure

(Ref. Fig. 603)

(1)Job set-up

WARNING : BEFORE EXTENDING RAT, MAKE CERTAIN THAT RAT EXTENSION AREA IS FREE FROM PERSONNEL AND EQUIPMENT. DO NOT STAND DIRECTLY AFTER RAT OR IN ITS EXTENSION ARC WHILE DEPLOYING.

WARNING : BECAUSE OF POSSIBILITY OF ACCIDENTAL EXTENSION NO SERVICING OR MAINTENANCE IS TO BE PERFORMED ON RAT WHILE STOWED.

(a)Install safety barriers and display warning notices around RAT extension area.

(b)Extend RAT from flight compartment (Ref. 29-25-00, P. Block 301).

(c)At FR10, insert rigging pin 98A49601000000 in RAT control quadrant.

NOTE : Make certain that, in flight compartment, RAT control handles are in OFF position.

(d)Open MLG doors (Ref. 32-12-11, P. Block 301).

(e)Put access platform in position in zone 671.

(2)Inspection

(a)Do detailed inspection of RAT control cables from pressure seals to ram air turbine :

1 Make certain that cables do not have kinks, broken wires or too much wear (Ref. 20-29-12, P. Block 1).

2 If there is damage, replace related cable (Ref. 20-29-11, P. Block 1).

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close MLG doors (Ref. 32-12-11, P. Block 301).

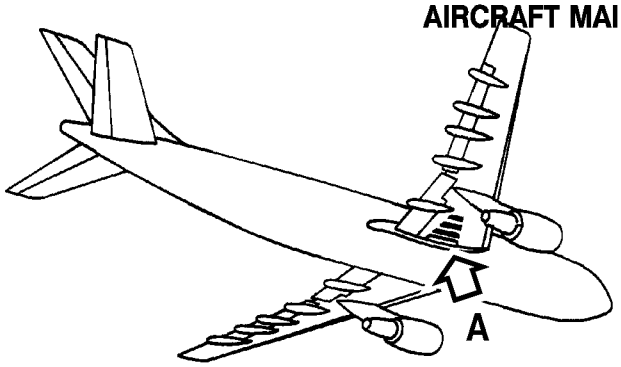
(c)Remove rigging pin P/N 98A49601000000 from quadrant at FR10.

(d)Retract RAT and close doors (Ref. 29-25-00, P. Block 301).

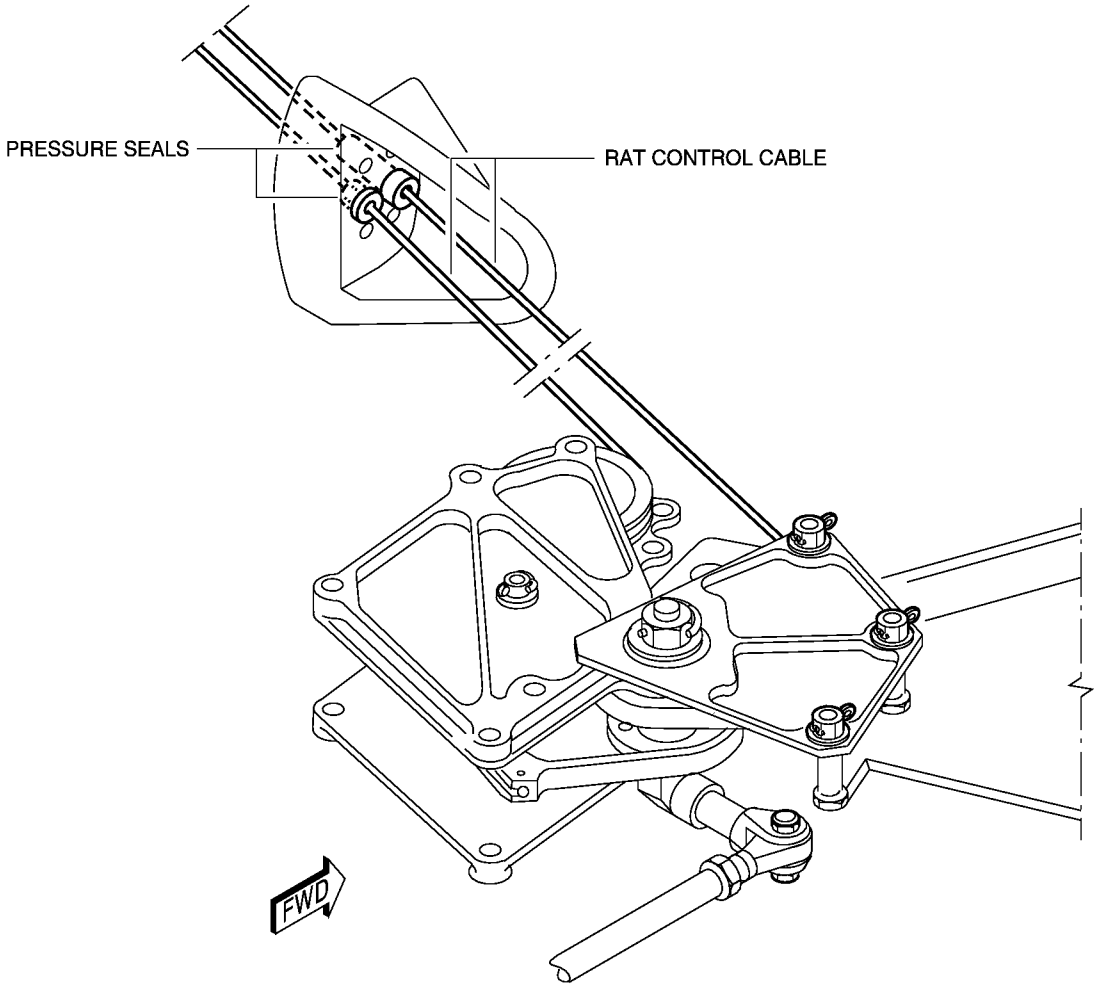
(e)Remove warning notices.

(f)Remove safety barriers.

(g)Remove access platform.



A



BM5 29 25 00 6 CBM0 01

RAT Control Cables between Pressure Seals and Ram Air Turbine
Figure 603

R

RAT CONTROL HANDLE - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A49601000000	Pin-Rigging, RAT Controls
Referenced Procedure - 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up
(1) In flight compartment, make certain that RAT control handles are in their housing.
(2) Insert rigging pin 98A49601000000 in RAT control quadrant at STA972/FR10.
(3) Remove access panel around RAT control handle assembly.

B. Removal
(1) Remove cotter pin (10).
(2) Remove self-locking nut (9) and discard. Retain washer (11).
(3) Remove bolt (3) and disengage RAT control cable end fitting (1).
(4) Remove the 4 cotter pins (7), remove nuts (6) and retain the 4 washers (5).
(5) Remove the 2 bolts (8) and the 2 bolts (4) equipped with bushes.
(6) Remove RAT control handle assembly (2).

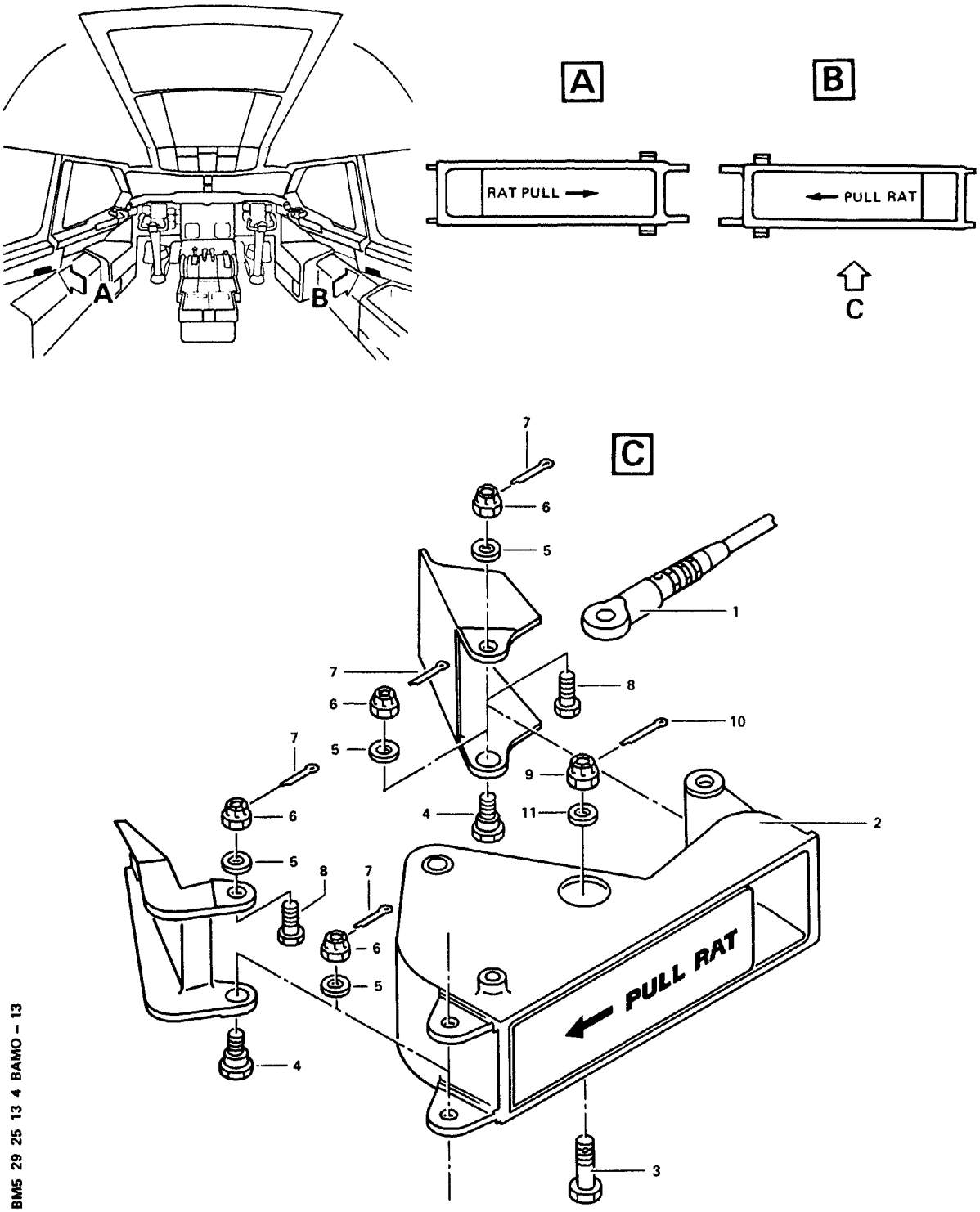
C. Preparation of Replacement Component
(1) Before installing new RAT control handle, make certain that it operates correctly and that the various parts are properly lubricated.

D. Installation
(1) Install new RAT control handle assembly (2) and make certain that it is in correct position (L and R sides : arrow marked on handle pointed towards aircraft nose)
(2) Install the 2 bolts (8) and the 2 bolts (4) equipped with bushes in their respective locations on supports. Install washers (5), tighten nuts (6) and safety with cotter pins.
(3) Install RAT control cable end fitting (1).
(4) Install bolt (3), install washer (11), tighten nut (9) and safety with cotter pin.

E. Test
(1) Remove and retain rigging pin 98A49601000000 from RAT control cable quadrant at STA972/FR10.
(2) Perform RAT extension test (Ref. 29-25-00, P. Block 301).

F. Close-Up
(1) Remove all ground handling and maintenance equipment, standard and special tools together with all access equipment and miscellaneous items.

(2)In flight compartment, attach access panel around RAT control handle assembly.



RAT Control Handle
Figure 401

RAM AIR TURBINE CONTROL HANDLE - CLEANING/PAINTING

1. Reason for the Job
   To prevent any corrosion and seizing of RAT control handle.

2. Equipment and Material

ITEM	DESIGNATION
(a)	Nylon Brushes
(b)	Wad of Cotton Wool
(c)98A49601000000	Pin Rigging - RAT Control
(d)Material No. 04-004A	Common Grease (Ref. 20-31-00)

R **ON A/C 001-104,

R Post SB 29-2075 For A/C 001-104,

(d)Material No. 04-004	Common Grease (Ref. 20-31-00)

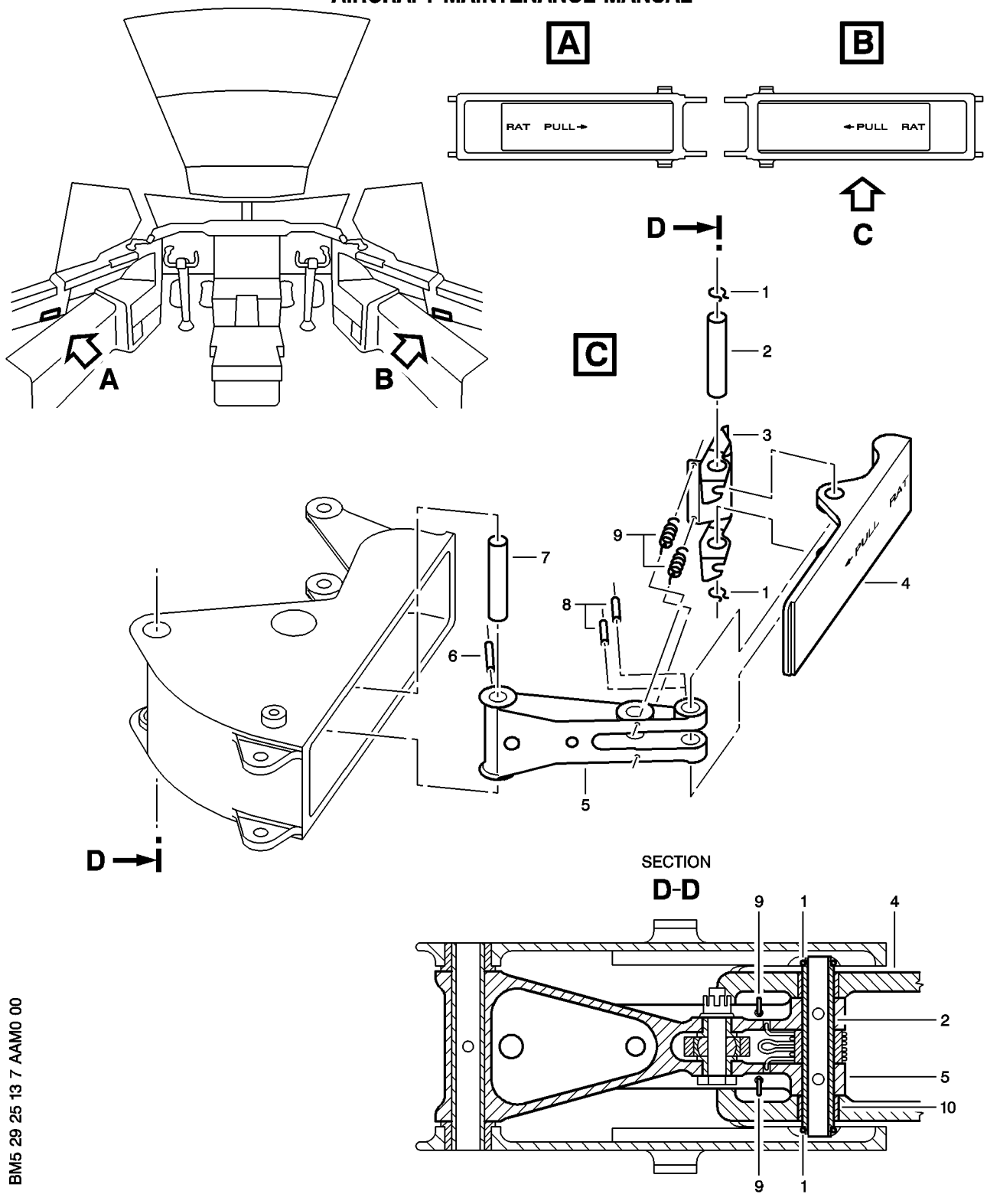
**ON A/C ALL

(e)Material No. 11-002	Cleaning Agent (Ref. 20-31-00)
Referenced Procedures	
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-13, P. Block 401	RAT Control Handle

3. Procedure
   (Ref. Fig. 701)

A. Job Set-Up
   (1)In flight compartment make certain that RAT control handles are in their housing.
   (2)Insert rigging pin 98A49601000000 in RAT control cable quadrant at STA 972/FR10.
   (3)Remove RAT control handle (Ref. 29-25-13, P. Block 401).

B. Cleaning and Greasing
   (1)Removal of lever assy.
      (Ref. Fig. 701)
      (a)Remove and retain spring pin (6).
      (b)Remove hollow pin (7) and remove lever assy from box.
   (2)Removal of hollow pin (2) for inspection.
      (a)Remove and retain springs (9).
      (b)Remove and retain spring pin (8).
      (c)Remove retaining ring (1) and remove hollow pin (2).
      (d)Disconnect grip control (4) from lever assy.
      (e)Visually inspect for corrosion retaining ring (1) hollow pin (2) and bushes (10) on grip control (4).
      (f)If corroded, clean with Material No. 11-002 and grease with Material



BM5 29 25 13 7 AAM0 00

RAT Control Handle
Figure 701

No. 04-004A.
NOTE : If traces of corrosion are found on bushes (10) and hollow pin (2), visually inspect other points of lever assy, clean with Material No. 11-002 and grease with Material No. 04-004A.

R **ON A/C 001-104,

R Post SB 29-2075 For A/C 001-104,

(f)If corroded, clean with Material No. 11-002 and grease with Material No. 04-004.
NOTE : If traces of corrosion are found on bushes (10) and hollow pin (2), visually inspect other points of lever assy, clean with Material No. 11-002 and grease with Material No. 04-004.

**ON A/C ALL

(3)Installation of lever assy.
(a)Put grip control (4), hook (3) and lever (5) in position.
(b)Install hollow pin (2).
(c)Install spring pin (8).
(d)Install retaining ring (1).
(e)Install spring (9).
(f)Install lever assy on box.
(g)Install hollow pin (6).
(h)Install spring pin (6).
(4)Install RAT control handle (Ref. 29-25-13, P. Block 401).

C. Test
(1)Remove and retain rigging pin 98A49601000000 from RAT control cable quadrant at STA972/FR10.
(2)Perform RAT extension test (Ref. 29-25-00, P. Block 301).

D. Close-Up
(1)Remove all ground handling and maintenance equipment, standard and special tool with all access equipment and miscellaneous items.
(2)In flight compartment, attach access panel around RAT control handle.

FLEXIBLE CONTROL (RAM AIR TURBINE) - REMOVAL/INSTALLATION

1. Reason for the Job

A. Removal/Installation of Cable of Left Side

B. Removal/Installation of Cable of Right Side

C. Removal/Installation of Sheath on Left Side

D. Removal/Installation of Sheath on Right Side

2. Equipment and Materials

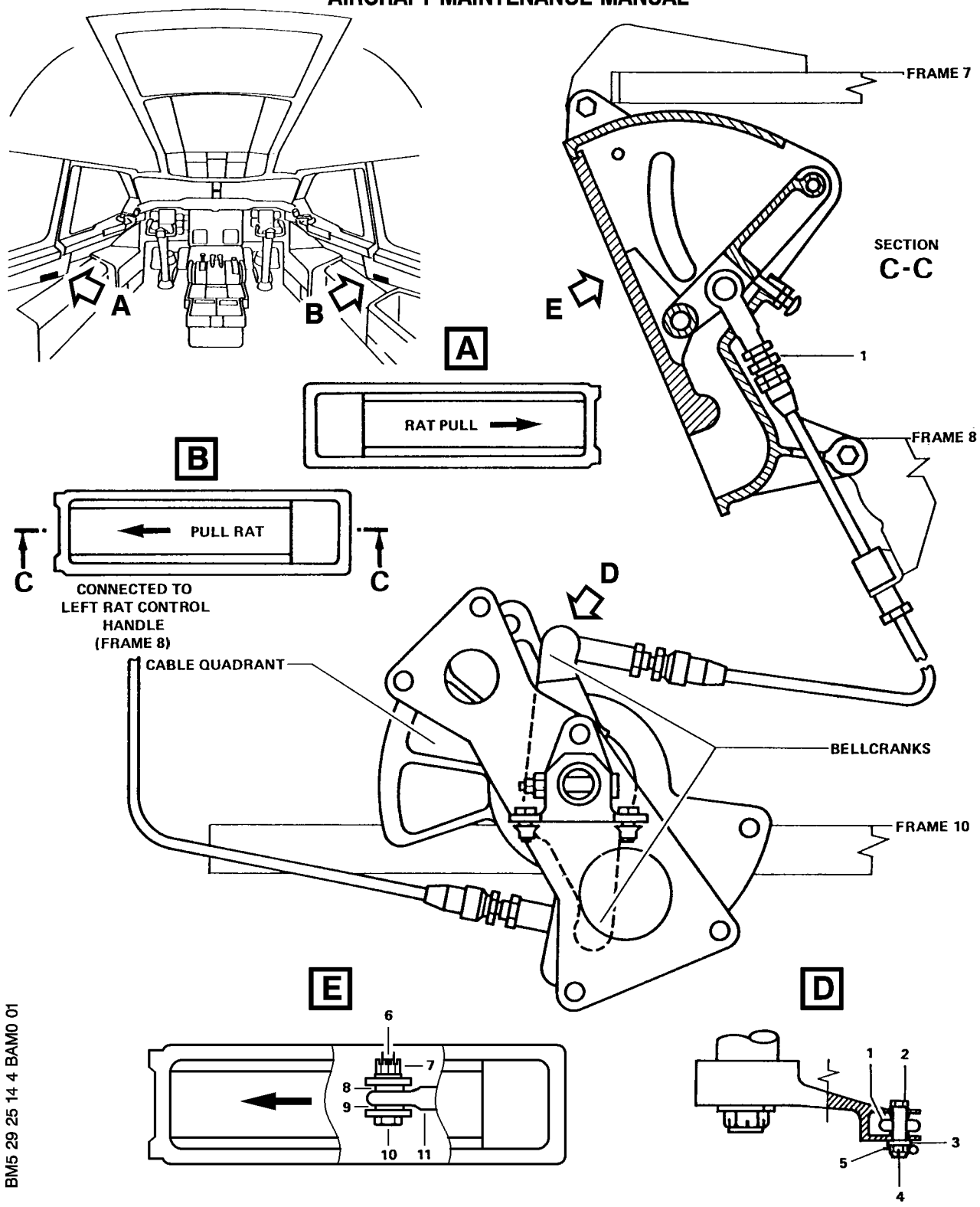
ITEM	DESIGNATION
A. 98A49601000000	Pin-Rigging, RAT Controls
B. Material No. 04-004	Common Greases (Ref. 20-31-00)
C. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
D. Material No. 11-004B	Cleaning Agents (Ref. 20-31-00)
Referenced Procedure - 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)

NOTE : To perform correctly the removal of cable ends, items (15), (16), (17), it is necessary to use metric wrenches (15 mm, 17 mm thin spanners).

3. Procedure

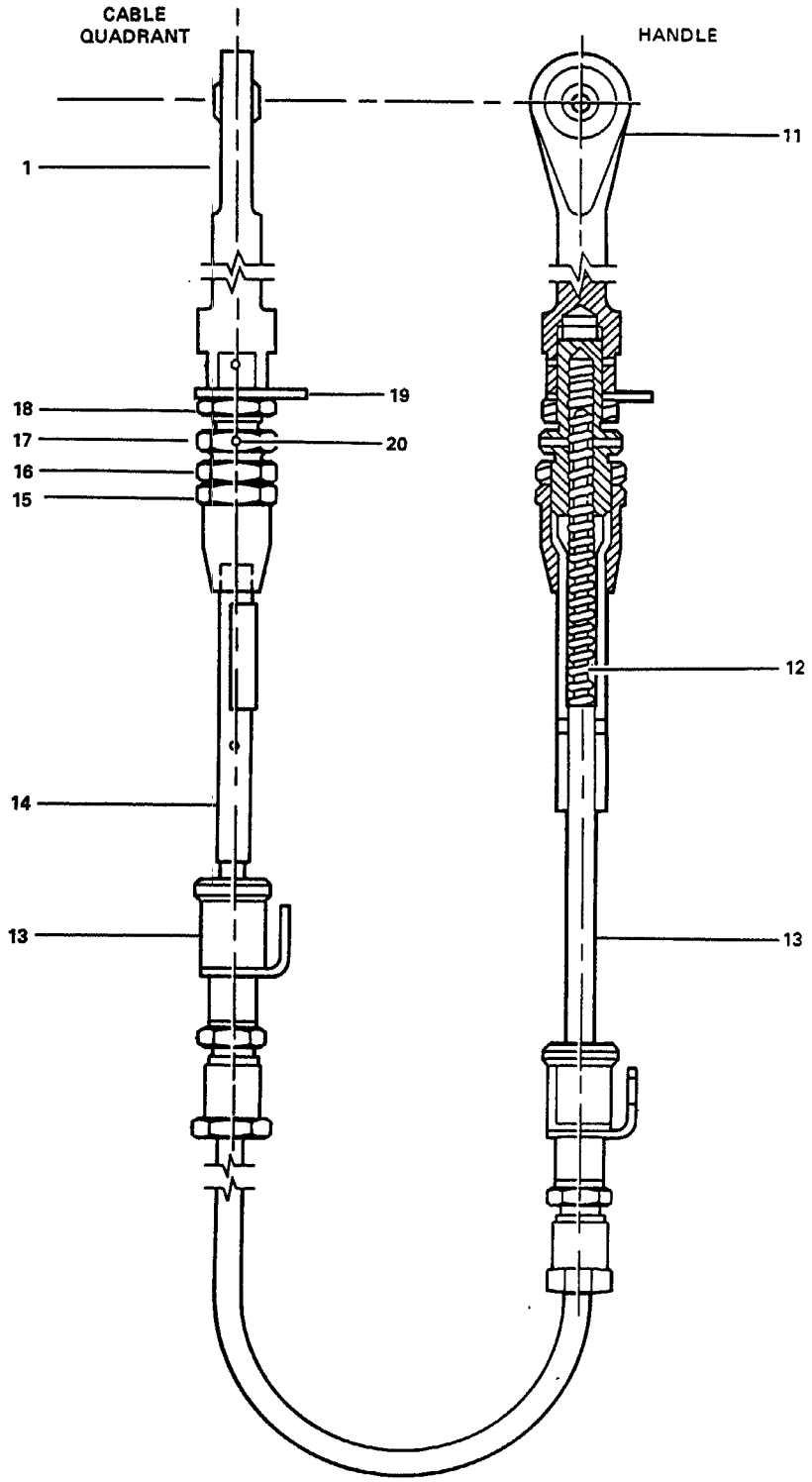
A. Job Set-Up
(1)Extend RAT (Ref. 29-25-00, P. Block 501).
(2)At STA972/FR10, insert rigging pin in RAT CONTROL bellcrank, using tool 98A49601000000.
NOTE : Make certain that, in flight compartment, the RAT CONTROL HANDLES are in OFF position.

B. Removal of Cable on Left Side
(1)Disengage eye end fitting from bellcrank of the cable quadrant, (avionics compartment FR10), (Ref. Fig. 401, 402).
(a)Remove cotter pin (4).
(b)Loosen castellated nut (5), retain washer (3).
(c)Extract bolt (2) and disengage eye end fitting (1).
(d)Loosen the safety nut (16) and unscrew the tightening cone (15) to release the cable.
(e)Unscrew the eye end fitting (1) with items (16, 17, 18 and 19) from cable (12).
(f)Remove the tightening cone (15) and the sliding tube (14) from the swivel tube (13), taking care not to bend the swivel tube.
(2)Removal of the cable (Ref. Fig. 401, 402)
(a)To gain access to the RAT control handle bellcrank and eye end fitting, remove the following equipment :



Flexible Control (Ram Air Turbine)
Figure 401

R



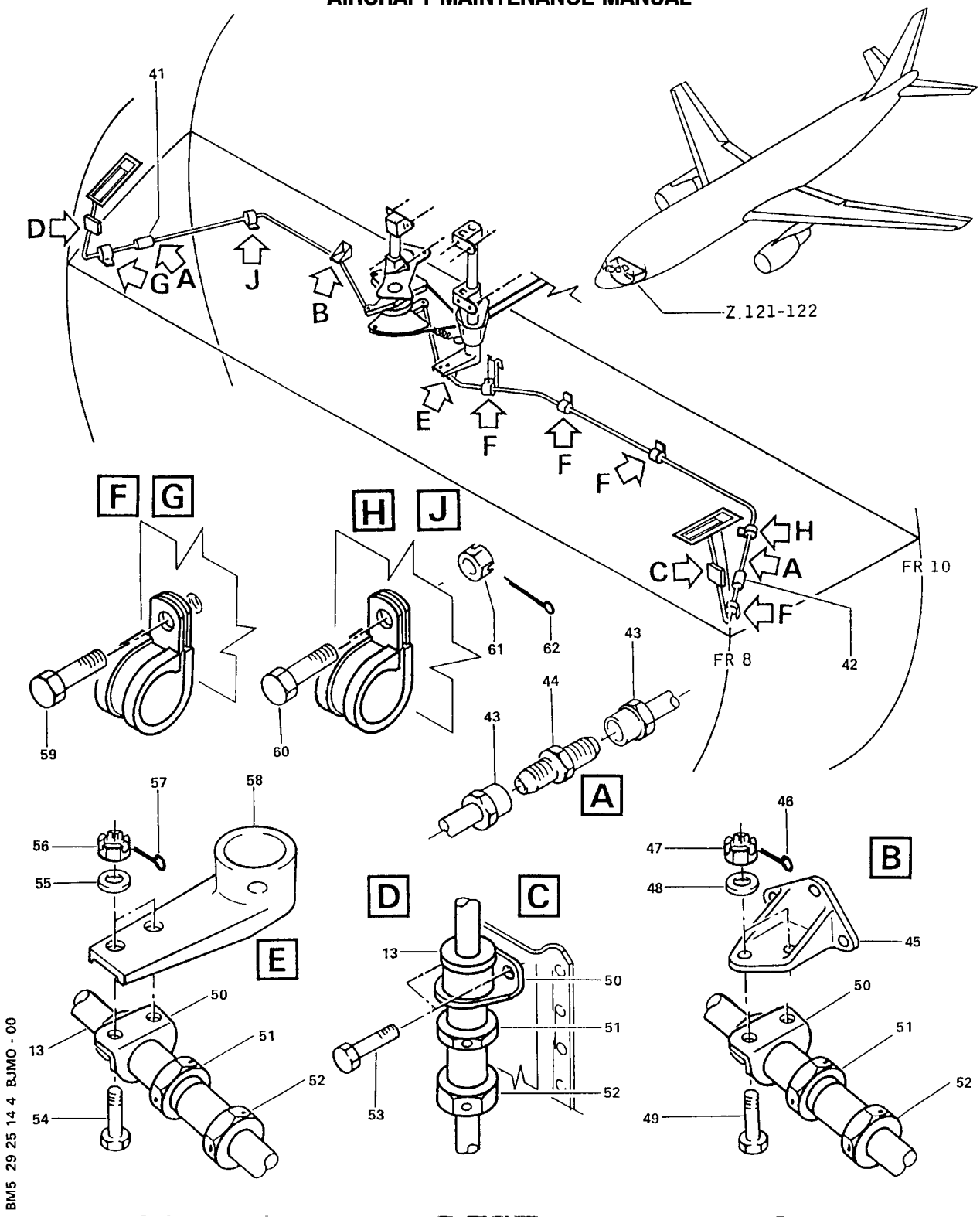
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Flexible Control Cable
Figure 402

(b)Unscrew screws of panels around the RAT control handle.
(c)Remove panels.
(d)Disengage eye end fitting from RAT control handle bellcrank :
1 Remove cotter pin (6).
2 Loosen castellated nut (7).
3 Extract bolt (10) and retain washers (8), (9) to disengage eye end fitting (11) from RAT control handle bellcrank.
(e)Removal of the cable
1 Pull the eye end fitting (11) still connected to the cable from the sheath.
CAUTION : UNTIL THE SLIDING TUBE IS ENGAGED ON THE SWIVEL TUBE, TAKE CARE TO SLIDE THE SLIDING TUBE IN THE SAME AXIS AS THE SWIVEL TUBE IN ORDER NOT TO BEND THE SWIVEL TUBE AND THE SHEATH.
(f)Remove the eye end fitting from the cable by performing the procedure described in Para. (1)(d) to (1)(f).

C. Removal of Cable on Right Side
(1)Disengage eye end fitting from bellcrank of the cable quadrant, (avionics compartment FR10), (Ref. Fig. 401, 402).
(a)Remove cotter pin (4).
(b)Loosen castellated nut (5), retain washer (3).
(c)Extract bolt (2) and disengage eye end fitting (1).
(d)Loosen the safety nut (16) and unscrew the tightening cone (15) to release the cable.
(e)Unscrew the eye end fitting (1) with items (16, 17, 18 and 19) from cable (12).
(f)Remove the tightening cone (15) and the sliding tube (14) from the swivel tube (13) taking care not to bend the swivel tube.
(2)Removal of the cable (Ref. Fig. 401, 402)
(a)To gain access to the RAT control handle bellcrank and eye end fitting, remove the following equipment :
(b)Unscrew screws of panels around the RAT control handle.
(c)Remove panels.
(d)Disengage eye end fitting from RAT control handle bellcrank :
1 Remove cotter pin (6).
2 Loosen castellated nut (7).
3 Extract bolt (10) and retain washers (8), (9) to disengage eye end fitting (11) from RAT control handle bellcrank.
(e)Removal of the cable
1 Pull the eye end fitting (11) still connected to the cable from the sheath.
CAUTION : UNTIL THE SLIDING TUBE IS ENGAGED ON THE SWIVEL TUBE, TAKE CARE TO SLIDE THE SLIDING TUBE IN THE SAME AXIS AS THE SWIVEL TUBE IN ORDER NOT TO BEND THE SWIVEL TUBE AND THE SHEATH.
(f)Remove the eye end fitting from the cable by performing the procedure described in Para. (1)(d) thru (1)(f).

D. Removal of the Left Sheath (Ref. Fig. 403)
CAUTION : BEFORE REMOVING THE SHEATH (MADE IN TWO PARTS) IT IS NECESSARY TO



Ram Air Turbine Control
Figure 403

MARK ITS ROUTING BY A TAPE OR A CABLE TO FACILITATE ITS INSTALLATION.

(1)At the connection of both sheaths (42), cut and remove lockwire and unscrew the nuts (43) from the union (44).
(2)In the flight compartment, in the RAT control handle housing, on the support of the swivel tube, unsafety and unscrew the nut (52).
(3)Unsafety the two bolts (53) remove the swivel tube (13) with the two bolt (53).
(4)At the lower end of the sheath, on the support (58), unsafety and unscrew the nut (52).
(5)On the support (58), remove cotter pin (57), loosen castellated nuts (56), remove swivel tube (13) with washers (55), extracts bolts (54).
(6)Unscrew the five clamps to remove the sheath.
(7)Remove the lower/upper sheath (removal from lower side).
CAUTION : TAKE CARE NOT TO DAMAGE THE SHEATH DURING THE REMOVAL.

E. Removal of the Right Sheath (Ref. Fig. 403)
CAUTION : BEFORE REMOVING THE SHEATH (MADE IN TWO PARTS) IT IS NECESSARY TO MARK ITS ROUTING BY A TAPE OR A CABLE TO FACILITATE ITS INSTALLATION.

(1)At the connection of both sheaths (41), cut and remove the lockwire and unscrew nuts (43) from union (44).
(2)In the flight compartment, in the RAT control handle housing, cut and remove the lockwire and unscrew the nut (52) to remove the swivel tube (13) with the union.
(3)At the lower end of the sheath, on the support (45), unsafety and unscrew the nut (52).
(4)On the support (45), remove cotter pin (46), retain swivel tube (13), loosen castellated nuts (47), remove swivel tube (13), washers (48) and extracts bolts (49).
(5)Remove the two remaining clamps installed on the sheath.
(6)Remove the lower/upper sheath (removal from upper side).

F. Preparation of Replacement Component (Sheath)
(1)Check the sheath for damage or abnormal bend, if the sheath is damaged replace it.
(2)To clean inside the sheath, inject some cleaning agent (white spirit Material No. 11-002 or chorothene NU Material No. 11-004B). Insert the cable cleaned and free from grease in the sheath and push/pull it inside to clean the sheath.
(3)Remove the cable.
(4)Inject some cleaning agent to clean inside and dry the sheath with nitrogen or dry compressed air.

G. Installation of the Sheath on the Left Side
(Ref. Fig. 403)
CAUTION : DURING SHEATH INSTALLATION, TAKE CARE NOT TO DAMAGE OR BEND THE SHEATH.

(1)Install the upper sheath from the avionics compartment by following the marking installed during the removal procedure.
(2)In the flight compartment, in the RAT CTL handle housing, install the

swivel tube (13) with the union (51) on the sheath end. Do not tighten the nut (52) at this stage.

(3)Install bolts (53). Do not tighten at this stage.

NOTE : Take care to get the correct positioning of the swivel tube lug (35) on the structural fitting support.

(4)In the avionics compartment, install the lower sheath in the clamps (Ref. Details F. and H.).

(a)Install screw (59) on clamps (Ref. Detail F.).

(b)Install bolt (60) and castellated nut (61) on clamps (Ref. Detail H.).

(c)Do not tighten at this stage.

(5)Connect the lower and upper sheaths together at connection (42). Do not tighten at this stage.

(6)At the lower end of the sheath, on the support (58) position the swivel tube (13), install the bolts (54), washers (55) and castellated nuts (56). Do not tighten at this stage.

NOTE : Take care to get the correct positioning of the swivel tube lug (50) on the support (58).

(7)At the lower end of the sheath, on the support (58), position the nut (52) on the swivel tube union (51). TIGHTEN nut (52) and wirelock.

(8)At the lower and upper sheath connection, TIGHTEN nut (43) and wirelock.

(9)At the lower end of the sheath, on the support (58) TIGHTEN the nuts (56) and secure with cotter pin (57).

(10)In the cockpit, in the RAT CTL handle housing, TIGHTEN the nut (52) and wirelock.

(11)In the cockpit, in the RAT CTL handle housing, on the swivel tube lug (50) TIGHTEN the bolts (53) and wirelock.

(12)In the avionics compartment, TIGHTEN screws (59) on clamps (Ref. Detail F.). TIGHTEN castellated nut (61) on clamps (Ref. Detail H.) and secure with cotter pin (62).

H. Installation of the Sheath on the Right Side
(Ref. Fig. 403)

CAUTION : DURING SHEATH INSTALLATION, TAKE CARE NOT TO DAMAGE OR BEND THE SHEATH.

(1)Install the upper sheath from the flight compartment by following the marking installed during the removal procedure.

(2)In the cockpit, in the RAT CTL handle housing, install the swivel tube (13) with the union (51) on the sheath end. Do not tighten the nut (52) at this stage.

(3)Install bolts (53). Do not tighten at this step.

NOTE : Take care to get the correct positioning of the swivel tube lug (35) on the structural fitting support.

(4)In the avionics compartment, install the lower sheath in the clamps (Ref. Details G. and J.).

(a)Install screw (59) on clamps (Ref. Detail G.).

(b)Install bolt (60) and castellated nut (61) on clamps (Ref. Detail J.).

(c)Do not tighten at this stage.

(5)Connect the lower and upper sheaths together at connection (42). Do not tighten at this stage.

(6)At the lower end of the sheath, on the support (45) position the swivel tube (13), install the bolts (49), washers (48) and castellated nuts

(47).
NOTE : Take care to get the correct positioning of the swivel tube lug (50) on the support (45).
(7)At the lower end of the sheath, on the support (45), position the nut (52) on the swivel tube union (51). TIGHTEN nut (52) and wirelock.
(8)At the lower and upper sheath connection, TIGHTEN nut (43) and wirelock.
(9)At the lower end of the sheath, on the support (45) TIGHTEN the nuts (47) and secure with cotter pin (46).
(10)In the cockpit, in the RAT CTL handle housing, TIGHTEN the nut (52) and wirelock.
(11)In the cockpit, in the RAT CTL handle housing, on the swivel tube lug (50) TIGHTEN the bolts (53) and wirelock.
(12)In the electronic bay, TIGHTEN screws (59) on clamps (Ref. Detail G.). TIGHTEN castellated nut (61) on clamps (Ref. Detail J.) and secure with cotter pin (62).

J. Preparation of Replacement Component (Cable)
(1)For the removed cable
(a)Clean the cable with cleaning agent (White Spirit Material No. 11-002 or chlorotene NU Material No. 11-004B) with a brush.
(b)Dry the teleflex cable with nitrogen or dry compressed air.
(c)Inspect the cable. If trace of corrosion is found, the cable has to be replaced by a new one.
(d)Grease the cable using Material No. 04-004.
R (2)For a new cable (Ref. Fig. 402).
R NOTE : The new cable is delivered not assembled and with an overlength.
R The cable must be installed as described in the steps below
R before cutting it.
R (a)Do the steps 3.K.(1) to 3.K.(5)(c).
R (b)Put the eye-end fitting (1) in position in the bellcrank of the cable
R quadrant.
R (c)Put the overlength cable next to the eye-end fitting (1).
R (d)Cut the overlength of the cable (at the junction of the tapped end of
R the eye-end fitting (1) and the item (19) (Ref. Fig. 402)).
R (e)Cone-shaped deburr the cable in the winding direction.

K. Installation of the LH Cable (Ref. Fig. 401, 402)
(1)Engage the sliding tube (14) provided with the tightening cone (15) on the cable (12), already greased with Material No. 04-004 (sliding tube engaged first).
(2)Screw the eye end fitting (11) with items (16), (17), (18), (19) on cable (12).
Check through the witness hole (20) that the cable (12) is screwed in sufficiently.
(3)Tighten the cone (15) on eye end fitting union (17) and lock nut (16).
(4)In the RAT CONTROL HANDLE housing, engage the cable (12) into the sheath through the swivel tube (13), taking care not to bend the swivel tube.
(5)Through the access panel, connect the eye end fitting to the RAT CONTROL HANDLE bellcrank :
(a)Engage and position the eye end fitting (11) on the RAT CONTROL HANDLE bellcrank.

(b)Install bolt (10), washers (8) and (9) and castellated nut (7).
(c)TIGHTEN the nut (7) and secure with cotter pin (6).

(6)In the avionics compartment, on the other end of the cable (12), install the sliding tube (14). Provided with the tightening cone (15) into the cable (12) and the swivel tube (13), (sliding tube engaged first).

(7)Screw the eye end fitting (1) with items (16), (17), (18), (19).

NOTE : Take care to get the correct length to connect the eye end fitting (1) in the bellcrank of the cable quadrant.

(8)Check through the withness hole (20) that the cable (12) is screwed in sufficiently.

NOTE : For more details, refer to 29-25-00, P. Block 501, Para. 1.C.(2)(a) for flexible control adjustment.

(9)When length is correctly adjusted, tighten the cone (15) on eye end fitting union (17) and locknut (16).

(10)To connect the eye end fitting to the bellcrank of the cable quadrant, install the bolt (2), the washer (3), the castellated nut (5), TIGHTEN the nut (5) and secure with cotter pin (4).

L. Installation of the RH Cable (Ref. Fig. 401, 402)

(1)Engage the sliding tube (14) provided with the tightening cone (15) on the cable (12), already greased with Material No. 04-004 (sliding tube engaged first).

(2)Screw the eye end fitting (11) with items (16), (17), (18), (19) on cable (12).
Check through the witness hole (20) that the cable (12) is screwed in sufficiently.

(3)Tighten the cone (15) on eye end fitting union (17) and lock nut (16).

(4)On the RAT CONTROL HANDLE, engage the eye end fitting (11) in the RAT CTL HANDLE bellcrank.

(5)Install bolt (10), washer (8) and (9) and the castellated nut (7).
TIGHTEN the nut (7) and secure with cotter pin (6).

(6)In the RAT CONTROL HANDLE housing engage the cable (12) into the sheath through the swivel tube (13), taking care not to bend the swivel tube.

(7)Install the RAT CONTROL HANDLE in its housing when the sliding tube (14) is fully engaged on the swivel tube (13) (check can be done through the access panel).

(8)In the avionics compartment, on the other end of the cable (12), install the sliding tube (14), provided with the tightening cone (15) into the cable (12) and the swivel tube (13) (sliding tube engaged first).

(9)Screw the eye end fitting (1) with items (16), (17), (18), (19) on cable (12).

NOTE : Take care to get the correct length to connect the eye end fitting (1) in the bellcrank of the cable quadrant.

(10)Check through the witness hole (20) that the cable (12) is screwed in sufficiently.

NOTE : For more details, refer to 29-25-00, P. Block 501, Para. 1.C.(2)(a) for flexible control adjustment.

(11)When length is correctly adjusted, tighten the cone (15) on eye end fitting union (17) and locknut (16).

(12)To connect the eye end fitting (1) to the bellcrank of the cable quadrant, install the bolt (2), the washer (3), the castellated nut (5),

TIGHTEN the nut (5) and secure with cotter pin (4).

4. Test

A. Install panels.

B. Remove rigging pin P/N 98A49601000000 from quadrant at STA972 (FR10).

C. Perform RAT retraction and doors closing (Ref. 29-25-00, P. Block 501).

D. Perform RAT extension (Ref. 29-25-00, P. Block 501) with the left RAT CONTROL HANDLE.

E. Perform RAT retraction and doors closing (Ref. 29-25-00, P. Block 501).

F. Perform RAT extension (Ref. 29-25-00, P. Block 501) with the right RAT CONTROL HANDLE.

G. Perform RAT retraction and doors closing (Ref. 29-25-00, P. Block 501).

5. Close-Up

A. Remove all the equipment and miscellaneous items.

B. Re-install the equipment or access panels removed to gain access.

RAM AIR TURBINE CONTROL CABLE QUADRANT REMOVAL/INSTALLATION

1. Equipment and Materials

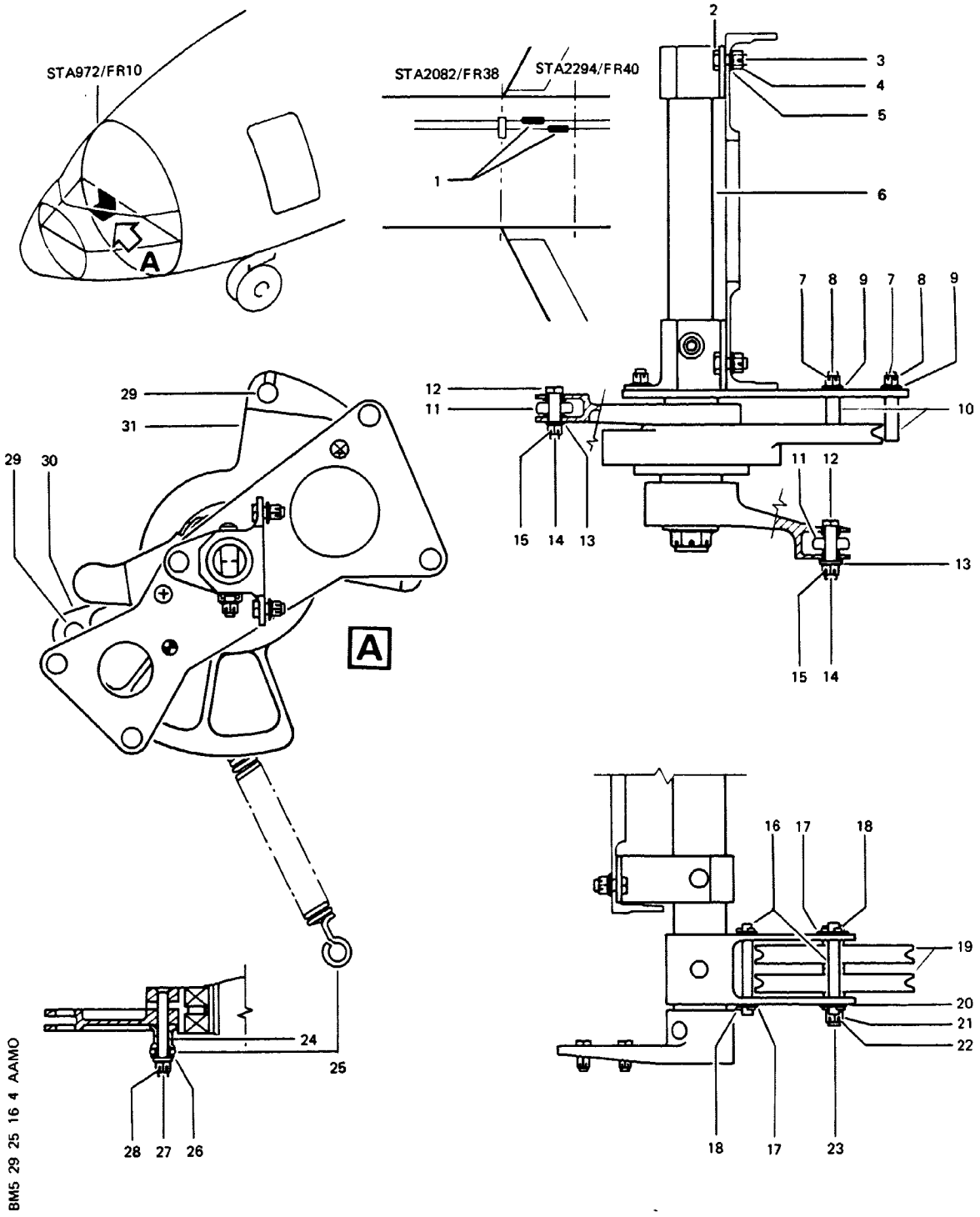
ITEM	DESIGNATION
A. 98A49601000000	Pin-Rigging, Ram Air Turbine Control
B. 98A29201001000	Pin-Rigging, Ram Air Turbine Drop-Out Controls
Referenced Procedure - 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)

2. Procedure

A. Job Set-Up
(Ref. Fig. 401)
(1)Make certain that ram air turbine (RAT) control handles located in flight compartment are in their housings.
R (2)Insert rigging pin 98A49601000000 in quadrant at FR10.
R (3)Open access door 671BB.
R (4)Insert rigging pin 98A29201001000 in fuselage-to-wing feedthrough
R bellcrank assembly at FR47 on right side.

B. Removal
(1)Slacken upper and lower cable runs using turnbuckles (1) located between FR38 and FR40.
(2)Remove cotter pins (18), washers (17), and cable guards (16). Retain washers (17).
(3)Remove cotter pin (22), castellated nut (21) and washer (20). Retain washers (20).
(4)Extract bolt (23) and remove pulleys (19).
(5)Remove cotter pin (28) and castellated nut (27).
(6)Remove bush (26) and spring (25). Retain spring (25).
(7)Screw castellated nut (27) back on to retain spacer (24).
(8)Remove cotter pins (7), castellated nuts (8), washers (9) and cable guards (10). Retain washers (9).
(9)Extract rigging pin 98A49601000000.
(10)Remove cotter pins (15), castellated nuts (14) and washers (13). Retain washers (13).
(11)Extract bolts (12) and remove ends (11) of left and right TELEFLEX cables from RAT.
(12)Turn tube and disengage cable ends (29) from quadrants (30) and (31).
NOTE : Mark both cable ends to ensure installation in correct notch on replacement quadrants.
(13)Remove cotter pins (3) and castellated nuts (4).
(14)Remove washers (5) and bolts (2). Retain washers (5).
(15)Remove tube (6).

C. Preparation of Replacement Component
(1)Make certain that sectors rotate freely.



RAT Control Quadrant at FR10
Figure 401

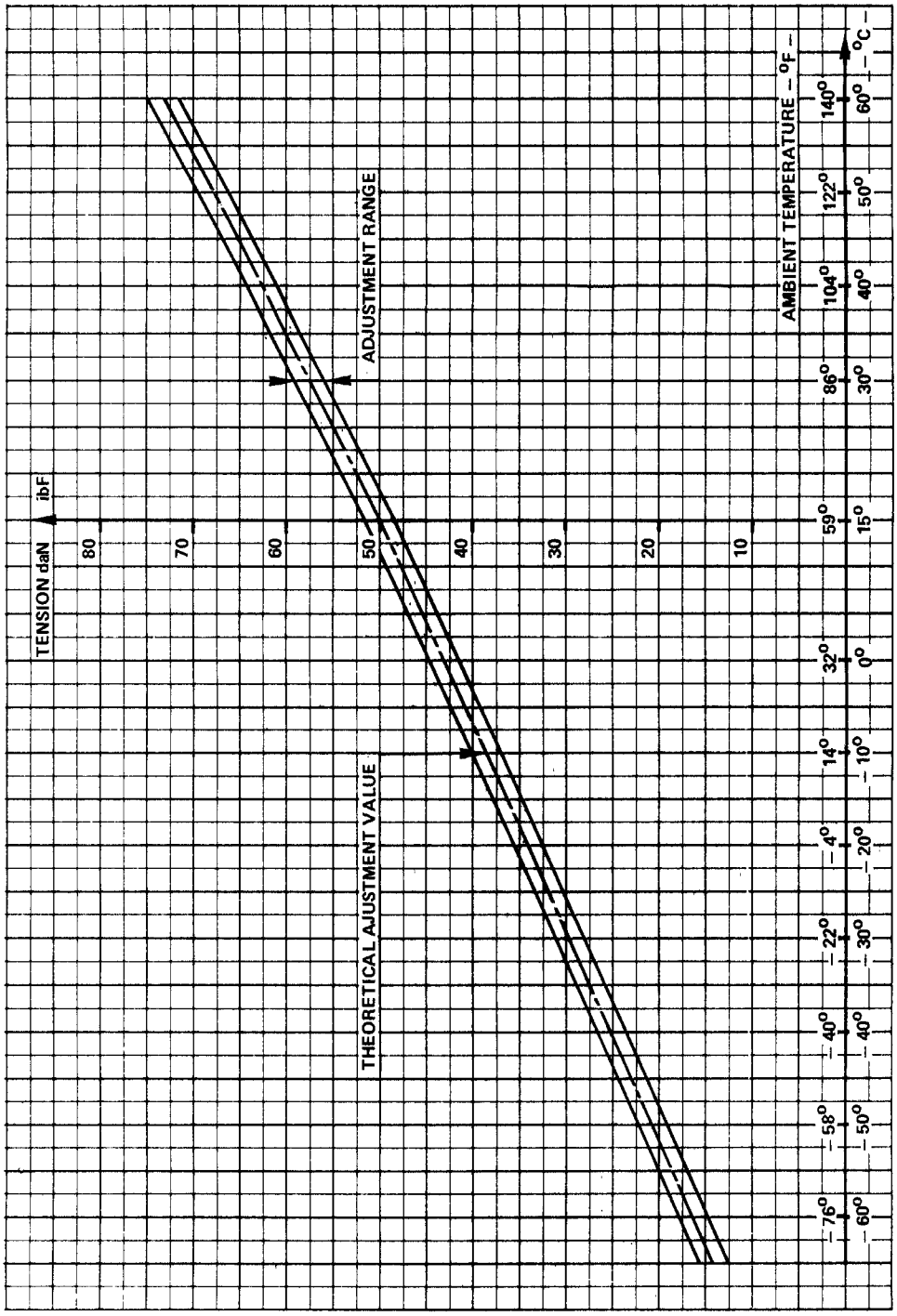
(2)Check that bonding surfaces are correctly stripped.
(3)Remove cable guards (Ref. step 2.B (8)).

D. Installation
(1)Position tube (6).
(2)Install bolts (2), washers (5) and castellated nuts (4).
(3)Tighten nuts (4) and safety with cotter pins (3)
(4)Install cable ends (29) and position cables in grooves of quadrants (30) and (31), ensuring that cables are not crossed.
(5)Position TELEFLEX cable ends (11). Install bolts (12), washers (13) and castellated nuts (14).
(6)Tighten nuts and safety with cotter pins (15).
(7)Install cable guards (10), washers (9) and castellated nuts (8).
(8)Tighten nuts and safety with cotter pins (7).
(9)Insert rigging pin 98A49601000000 in quadrant.
(10)Position pulleys (19) taking care to place cables correctly in grooves.
(11)Install bolts (23), washers (20) and castellated nut (21).
(12)Tighten nut and safety with cotter pin (22).
(13)Install cable guards (16), washers (17) and safety with cotter pins (18).
(14)Uncrew castellated nut (27) and install spring (25) equipped with bush (26).
(15)Screw and tighten nut (27).
(16)Safety with cotter pin (28).

E. Adjustment/Test

(Ref. Fig. 402)
(1)Using the turnbuckles located between FR38 and FR40 tighten cables to value corresponding to ambient temperature according to the graph.
(2)Make certain that the tension of both cables is equal so that rigging pins can be freely inserted in the quadrant at FR10 and the fuselage-to-wing feedthrough bellcrank assembly at FR47.
(3)Lockturnbuckles (1) with associated safety clips.
(4)Perform RAT extension/retraction test (Ref. 29-25-00, P. Block 301).

R F. Close-Up
R (1)Remove rigging pins.
R (2)Close access door 671BB.
R (3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



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RAT Cable Tension Regulating Graph
Figure 402

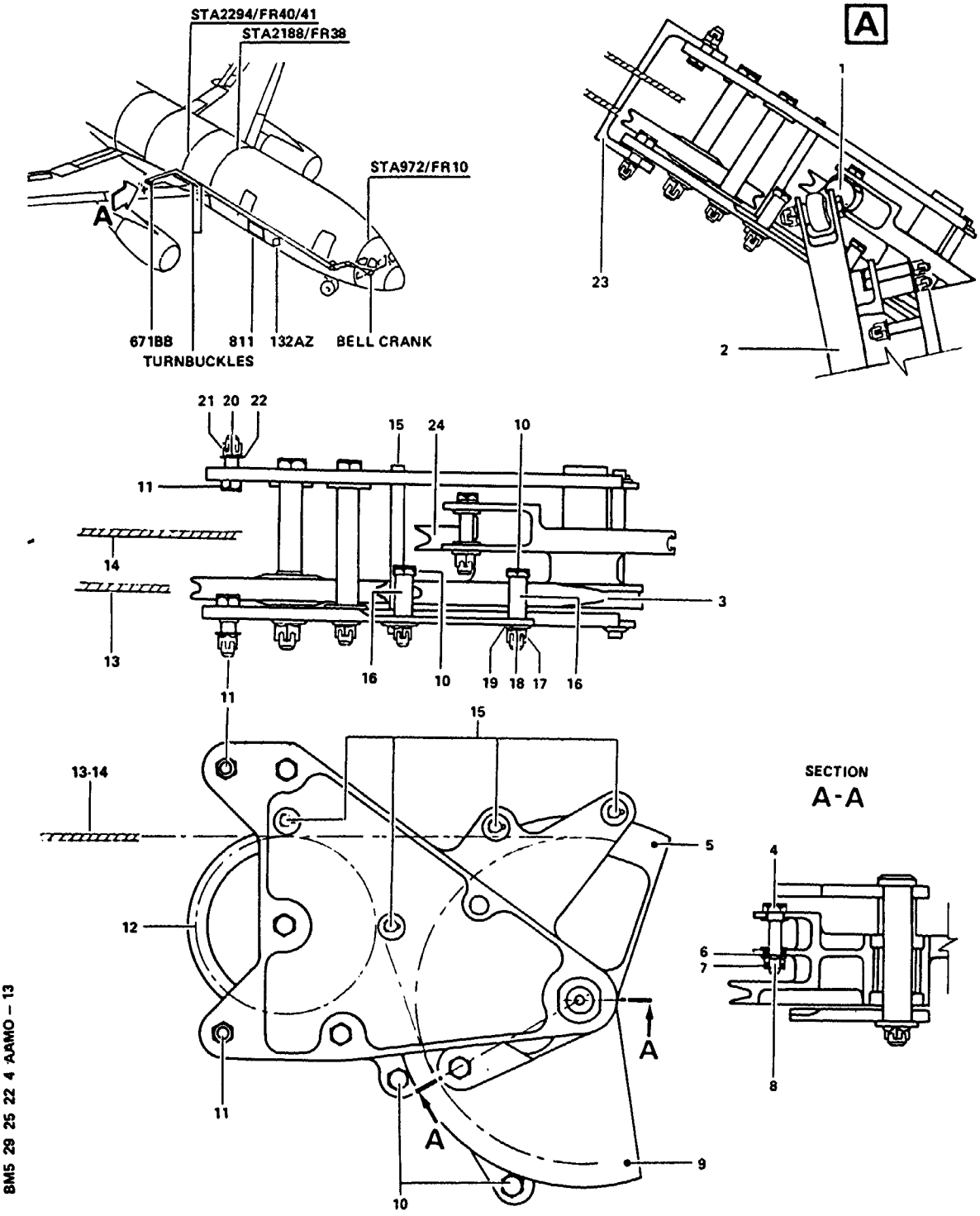
1. Equipment and Materials

ITEM	DESIGNATION
A. 98A29201000000	Pin - Rigging RAT Drop-Out Controls
B. 98A29201001000	Pin - Rigging RAT Drop-Out Controls
C. 98A49601000000	Pin - Rigging RAT Controls
D. Not Applicable	
E. 98A29203000000	Quadrant - Graduated Ram Air Turbine
F.	Access Platform, 2.60 m (8 ft. 8 in.)
Referenced Procedures	
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
- 52-33-00, P. Block 1	Cargo Compartment Door Hydraulic System

2. Procedure

A. Job Set-Up
(Ref. Fig. 401)
(1) In flight compartment, make certain that RAT control handles are in their housings. Display warning notices prohibiting operation of RAT.
(2) Display a warning notice prohibiting connection of test set to connector 142VC located in zone 144.
(3) Open cargo compartment door (Ref. 52-33-00, P. Block 1).
(4) In forward cargo compartment, open door 132AZ.
(5) At STA 9717/FR10, insert rigging pin 98A49601000000 in RAT control bellcrank.
(6) Position access platform at zone 671.
(7) Remove access door 671BB.
(8) On RAT mounting frame, insert rigging pin 98A2920100000 in uplock unit actuating lever.
(9) Remove safety clips from turnbuckles and slacken RAT control cables between FR38 and FR40. Discard safety clips.

B. Removal
(1) Remove cotter pin (7) from bolt (4) and discard cotter pin.
(2) Remove bolt (4), uncouple rod (1), retain washer (6) and nut (8).
(3) Remove the two cable guards (16) and retain them together with bolts, washers (10 and 19) and nuts (18). Discard cotter pins (17).
(4) Remove the four cable guards (15), retain cable guards, bolts and washers. Discard cotter pins.
(5) Remove the two bolts (11) retaining bellcrank assembly to bracket (23). Retain bolts, washers and nuts (11), (22) and (21) and discard cotter pins (20).
(6) Remove cotter pins (5) and (9) from cable end retaining notches.
(7) Remove upper run cable end and cable (14) from pulley assembly (24).
(8) Remove lower run cable end and cable (13) from pulley assembly (3).
(9) Remove bellcrank assy.



Bellcrank Assy
Figure 401

C. Preparation of Replacement Component
(1)Remove cable guards (16 and 15).
(2)Make certain that pulleys rotate freely.

D. Installation
(1)Position pulley assembly on support (23).
(2)Rotate pulley assembly (3) so that lower run cable end retaining notch is opposite pulley (12).
(3)Position lower run cable end (13) in its retaining notch hold cable in pulley (12) groove, rotate pulley assembly and make certain that cable seats correctly in groove.
(4)Position upper run cable end (14) in its retaining notch and make certain that cable seats correctly in groove.
(5)Install the two bolts (11) attaching bellcrank assy, install washer (22), nut (21) tighten and install cotter pins (20).
(6)Install cable guards (15), position cable guards (16) and install bolts (10), washers (19) and nuts (17) tighten and install cotter pins (18).
(7)Install cotter pins (5) and (9) from cable end retaining notches.
(8)Install rigging pin 98A29201001000 in bellcrank assy.
(9)Adjust cable tension so that it corresponds to ambient temperature, as shown on graph (Ref. 29-25-00, P. Block 501).
(10)Remove rigging pin from quadrant at STA 9717/FR10 and from bellcrank assy.
(11)Operate control several times to even out cable tension. Place RAT control handle in its housing. Make certain that rigging pins can be freely inserted in and removed from the two bellcranks.
Adjust, if required.
(12)Insert rigging pin 98A29201001000 in bellcrank assy.
(13)Manually open RAT doors.
(14)Remove rigging pin from uplock unit.
WARNING : FOR MANUAL EXTENSION OF RAT, MAKE CERTAIN THAT RAT TRAVEL RANGE IS CLEAR.
RAT UPLOCK UNIT IS VERY SENSITIVE, OPERATE WITH CARE.
DO NOT HOLD RAT ASSEMBLY DURING ITS EXTENSION.
DO NOT PLACE HANDS OR TOOLS IN RAT COMPARTMENT.
(15)Strictly observe precautions above and extend RAT using uplock unit actuating lever (2).
(16)Position rod (1) in bellcrank fork end. Safety rod (1) end fittings.
(17)Install bolt (4), washer (6) and nut (8).
NOTE : Screw cable ends into turnbuckles by equal amounts. Threads must not be visible when cable tension is adjusted.

E. Tests.
(1)Once RAT is extended, install ram air turbine graduated quadrant 98A29203000000.
(2)In flight compartment, extend RAT by pulling one of the two control handles.
(3)Check uplock unit actuating lever displacement (Ref. 29-25-00, P. Block 501).
(4)Perform RAT retraction and extension test. (Ref. 29-25-00, P. Block 301).
Leave RAT in extended configuration.

F. Close-Up
(1)Place RAT control handles in their housings.
(2)Install safety clips on RAT control cable turnbuckles.
(3)Make certain that working area in cargo compartment is clean and clear of tools and miscellaneous items of equipment.
(4)Close access door 132AZ.
(5)Close cargo compartment door (Ref. 52-33-00, P. Block 1).
(6)Fully tighten nut (8) and bolt (4) and install cotter pin (7).
(7)Make certain that working area at zone 671 is clean and clear of tools and miscellaneous items of equipment.
(8)Install access door 671BB.
(9)Retract RAT and close doors (Ref. 29-25-00, P. Block 301).
(10)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(11)In flight compartment remove warning notices.

RAM AIR TURBINE UPLOCK MECHANISM - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A. 97A29002500000	Protective Equipment - Ram Air Turbine
B.	Access Platform
C.	Warning Notices
D. Material No. 04-001	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

WARNING : INSTALL SAFETY BARRIER TO KEEP PERSONNEL AWAY FROM RAT OPERATING AREA.

WARNING : BEFORE EXTENDING RAT, MAKE CERTAIN THAT RAT EXTENSION AREA IS FREE FROM PERSONNEL AND EQUIPMENT. DO NOT STAND DIRECTLY AFT OF RAT OR IN ITS EXTENSION ARC WHILE DEPLOYING.

WARNING : BECAUSE OF THE POSSIBILITY OF ACCIDENTAL EXTENSION, NO SERVICING OR MAINTENANCE IS TO BE PERFORMED ON RAT WHILE STOWED.

(1)Position access platform at Zone 671.

(2)Position RAT protective equipment and display warning notices around ram air turbine (RAT) extension area.

(3)In flight compartment, extend RAT by pulling one of the two control handles. Once RAT is out, push control handle into its housing (Ref. 29-25-00, P. Block 301).

(4)Display a warning notice prohibiting connection of RAT ground check-out unit to electrical receptacle 142VC in zone 144.

B. Removal

(1)Disconnect uplock actuating linkage mechanism.

(a)Remove cotter pins (5) from the three nuts (4). Discard cotter pins.

(b)Remove the three nuts (4) and the three washers (3).

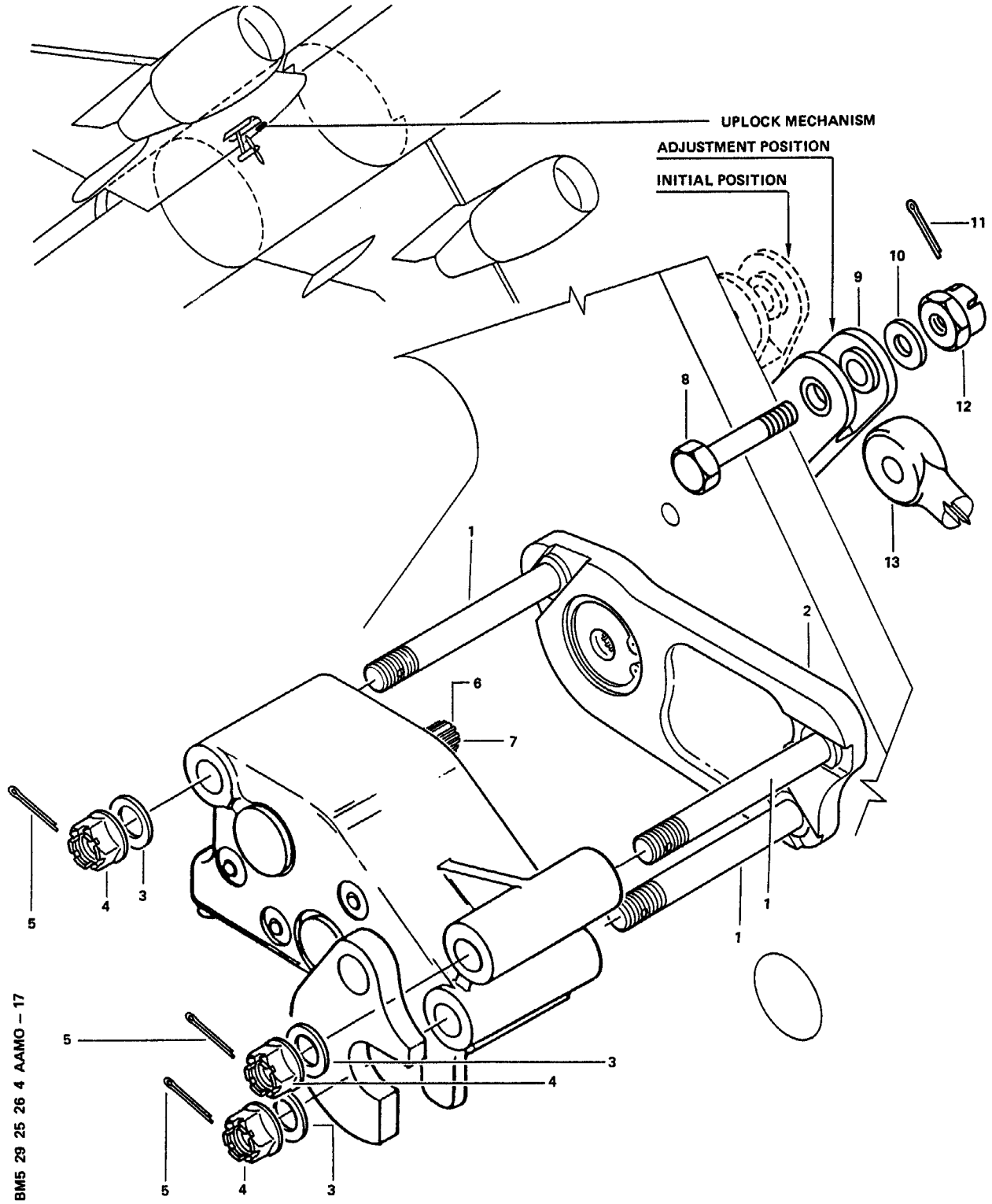
(c)Remove uplock mechanism.

C. Preparation of Replacement Component

(1)Lubricate splines of drive shaft (7) with Material No. 04-001.

D. Installation

R (1)Check that RAT control handles in flight compartment are in their
R housings so that drive shaft master spline (6) coincides with
R corresponding spline in back plate (2).
R (2)Position uplock mechanism on the three bolts (1).
R (3)Make certain that the splines of uplock mechanism drive shaft (7) mesh
R correctly with those of back plate (2).
R NOTE : If alignment is difficult :



Ram Air Turbine Uplock Mechanism
Figure 401

- Remove cotter pin (11), remove nut (12), remove bolt (8) and disengage rod (13) from lever (9).
- Act on lever (9) to perform alignment of mating splines.
- Position rod (13) on lever (9). Install bolt (8), washer (10) and nut (12). Tighten nut and safety with cotter pin.

(4)Install the three washers (3).
(5)Install and tighten the three nuts (4). Safety with cotter pins.

E. Test

R (1)Do the adjustment of RAT assy (Ref. 29-25-00, P. Block 501, Para. 1.C.(2)(c)).
R (2)Do the adjustment of the RAT extension unlocking angle (Ref. 29-25-00, P. Block 501, Para. 1.C.(2)(d)).
R (3)Do the RAT retraction/extension test (Ref. 29-25-00, P. Block 301).

F. Close-Up

(1)Retract RAT, close doors (Ref. 29-25-00, P. Block 301).
(2)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(3)Remove warning notices.

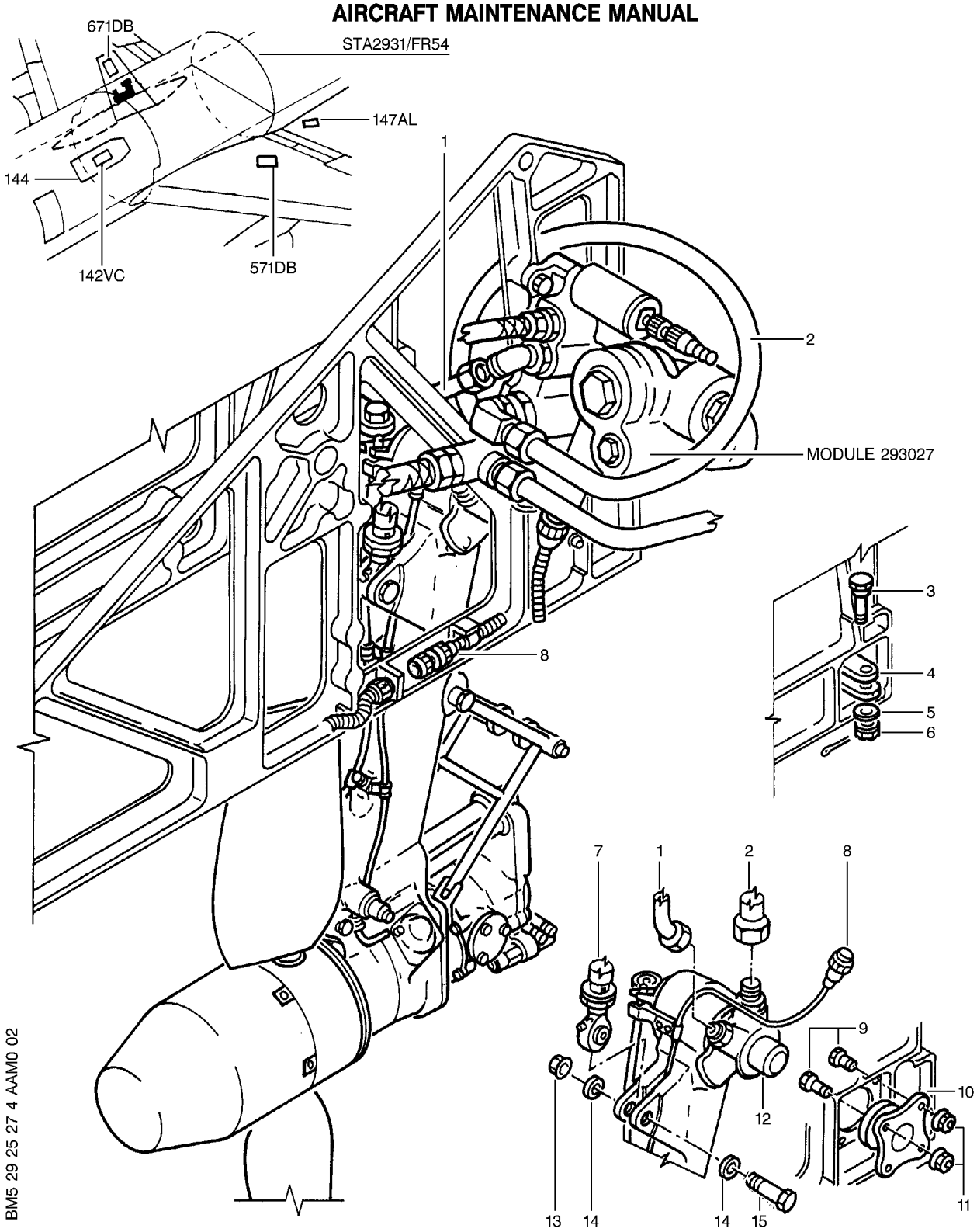
WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. POSITION SAFETY BARRIERS AND DISPLAY WARNING NOTICES AROUND RAT EXTENSION AREA.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 7 in.)
B.	Safety Barriers
C. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
R D. Material No. 09-001	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
R - 29-25-37, P. Block 401	Turbine Assembly - Removal/Installation
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 52-33-00, P. Block 301	Cargo Compartment Door Hydraulic System

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open right main gear main door (Ref. 32-12-11, P. Block 301). Install safety collars.
(2)Install access platform under Ram Air Turbine extension door.
(3)Make certain that cargo compartment doors are open, open them if they are to be used while aircraft is on ground (Ref. 52-33-00, P. Block 1). Display warning notices on access doors to selectors prohibiting closure cargo compartments doors.
(4)In flight compartment, extend RAT (Ref. 29-25-00, P. Block 301).
(5)In flight compartment, on HYD PWR panel 427VU, make certain that hydraulic power is in the following configuration :
(a)ELEC PUMPS pushbutton switch released (out).
(b)Yellow system PTU pushbutton switch released (out).
(c)PUMPS ENG1 and PUMPS ENG2 pushbutton switches released (out).
(6)Display a warning notice prohibiting operation of Yellow system :
(a)In flight compartment, on HYD PWR panel 427VU.



Ram Air Turbine
Figure 401

R

(b)On Yellow system ground connections.
(7)Open Green system ground connector access door 147AL. Display a warning notice on reservoir filling manual selector prohibiting filling of Yellow reservoir.
(8)Open access door 671DB.
(9)Depressurize Yellow system reservoir (Ref. 29-14-00, P. Block 301).
(10)Display a warning notice on ground connectors prohibiting pressurization of Yellow system.
(11)In hydraulic compartment, display a warning notice prohibiting use of hand pump.
(12)Depressurize Yellow system (Ref. 29-10-00, P. Block 301).
(13)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS/CTL & /CARGO DOOR/PUMP	7GX	333/T51
133VU	PTU CTL/G/Y	6GL	332/U60

B. Removal
WARNING : MAKE CERTAIN THAT HYDRAULIC SYSTEM IS NOT UNDER PRESSURE BEFORE PERFORMING ANY MAINTENANCE WORK ON THE RAT SYSTEM.
CAUTION : INSTALL TURBINE BLADE AND TURBINE ASSEMBLY PROTECTIVE COVERS WHENEVER THE RAT IS REMOVED FROM THE AIRCRAFT.
(1)Install protective covers on turbine blades and turbine assembly cover.
NOTE : Install blanking cap/plug on all removed hydraulic lines. Discard all removed seals. Install protective cover on electrical connector.
(2)Disconnect electrical connector (8) from RAT pivoted leg, free cable from clamps.
(3)Loosen delivery hose (1) coupling nut on module 3027 side (mark C on module).
(4)Loosen suction hose (2) coupling nut on module 3027 side (mark B on module).
(5)Remove hoses (1) and (2) on swivel joint (12) side.
(6)Remove cotter pin from nut (6), remove and retain nut (6) and washer (5).
(7)Remove the four bolts (9) from support bearing (10) and retain nuts (11).
(8)Remove cotter pin securing nut (13) and remove bolt (15) attaching ejection jack piston rod (7). Retain washers (14) and nut (13).
(9)Hold RAT in place, note position and remove support bearing (10).
(10)To remove RAT :
(a)Turn RAT around bolt (3).
(b)Free hoses (1) and (2).
(c)Remove bolt (3).
(11)Place RAT on ground.
(12)Remove hoses (1) and (2) to ease installation of new RAT.
(13)Install blanking caps/plugs on removed RAT and module ports.

C. Installation
NOTE : Inspect RAT for shipping or handling damage before instal-

lation.

CAUTION : THE RAT ASSEMBLY WEIGHS APPROXIMATELY 31.75 kg (70 lb) DO NOT LIFT BY TURBINE ASSEMBLY COVER OR TURBINE BLADES OR ALLOW THE RAT TO REST ON TURBINE ASSEMBLY COVER OR TURBINE BLADES DURING INSTALLATION IN AIRCRAFT

R (1)Apply sealant (Material No. 09-001) on the shouldered bolt (3).
R (2)Position RAT in its stowage compartment and engage end of trunnion shaft
R in mounting fork (4) and install shouldered bolt (3).

NOTE : The RAT is shipped full of Material No 02.003 (Ref. 20-31-00). Before installing RAT, make certain that it is full of hydraulic fluid.

R (3)Remove blanking caps/plugs, check orifices and connect hoses (1) and (2) on swivel joint (12) side.
R (4)Install support bearing (10) at other end of trunnion shaft.
R (5)Attach support bearing using bolts (9) and nuts (11). Tighten nuts.
R (6)Install washer (5) and nut (6) on shouldered bolt (3). Tighten and install cotter pin.
R (7)Remove blanking caps/plugs, check hoses (1) and (2) and RAT orifices.
R (8)Connect hoses (1) and (2) on RAT side. Tighten nuts.
R (9)Tighten hose (1) and (2) coupling nuts on module.
R (10)Connect 12VCA connector (8), route cable and attach clamps.
R (11)Position ejection jack piston rod (7), install washers (14), bolt (15) and nut (13). TORQUE nut (13) to between 250 and 400 lbf.in. and install cotter pin.
R (12)Adjust uplock roller (Ref. 29-25-00, P. Block 501).
R (13)Remove depressurizing equipment and pressurize Yellow hydraulic reservoir.
R (14)Top up Yellow reservoir (Ref. 12-12-29, P. Block 1).
R (15)Check for leakage.

D. Test
R (1)Do the manual blade (governor) twist test.
R (a)Manually turn both RAT blades carefully to the fine-pitch stop
R position (twisting range approx. 51 degrees) against the spring
R pressure, grasping each blade near the blade root. Quickly release
R the blades and let the spring pressure push the blades to the
R coarse-pitch position. Do this action three times and make sure
R that the blades go back to the hard stop at the full coarse-pitch
R position.
R (b)Replace the turbine assembly if the blades do not touch the hard stop
R at the full coarse-pitch position (Ref. 29-25-37, P. Block 401).
R (2)Perform RAT functional test (Ref. 29-25-00, P. Block 501).

E. Close-Up
(1)Check level of Yellow reservoir, top up if required (Ref. 12-12-29, P. Block 1).
(2)In RAT extension area.
(a)Check for leakage on ground test selector or on RAT.
(b)Remove safety barriers.
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3)Shut down and disconnect hydraulic ground power cart.
(4)Remove all ground handling and maintenance equipment, standard and special tools, together with all access equipment, miscellaneous items and warning notices.
(5)Bleed cargo compartment doors hydraulic system (Ref. 52-33-00, P. Block 301).
(6)Close circuits breakers 7GX and 6GL.
(7)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(8)Close cargo compartment doors if no other work is in progress (Ref. 52-30-00, P. Block 301).
(9)Close access door 671DB.
(10)In flight compartment, lead seal RAT control handle.

1. Reason for the Job
In the event of damaged turbine blades, see the manufacturer's instructions for repair.

RAT HYDRAULIC PUMP - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. POSITION SAFETY BARRIERS AND DISPLAY WARNING NOTICES AROUND RAT EXTENSION AREA.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8ft 7in.)
B.	Safety Barriers
C. Material No. 04-015	Commom Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power-Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
R - 29-25-37, P. Block 401	Turbine Assembly - Removal/Installation
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 52-33-00, P. Block 1	Cargo Compartment Doors

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open right main gear main door (Ref. 32-12-11, P. Block 301). Install safety collars.
(2)Install access platform under Ram Air Turbine extension door.
(3)Make certain that cargo compartment doors are open, open them if they are to be used while aircraft is on ground (Ref. 52-33-00, P. Block 1). Display warning notices on access doors to selectors prohibiting closure of cargo compartment doors.
(4)In flight compartment, extend RAT (Ref. 29-25-00, P. Block 301).
(5)In flight compartment, on HYD PWR panel 427VU, make certain that hydraulic power is in the following configuration.
(a)ELEC PUMPS pushbutton switch released (out).
(b)Yellow system PTU pushbutton switch released (out).
(c)PUMPS ENG1 and PUMPS ENG2 pushbutton switches released (out).
(6)Display a warning notice prohibiting operation of Yellow system :
(a)In flight compartment, on HYD PWR panel 427VU.
(b)On Yellow system ground connectors.
(7)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS/CTL&/CARGO DOOR/PUMP	7GX	333/T51
133VU	PTU CTL/G/Y	6GL	332/U60

R (8)Open Green system ground connector access door 147 AL. Display a warning notice on reservoir filling manual selector prohibiting filling of Yellow reservoir.
R (9)Open access door 671DB.
R (10)Depressurize Yellow system (Ref. 29-10-00, P. Block 301).
R (11)Display a warning notice on ground connectors prohibiting pressurization of Yellow system.
R (12)In hydraulic compartment, display a warning notice prohibiting use of hand pump.
R (13)Depressurize Yellow system reservoir (Ref. 29-14-00, P. Block 301).

B. Removal

WARNING : MAKE CERTAIN THAT HYDRAULIC SYSTEM IS NOT UNDER PRESSURE BEFORE PERFORMING ANY MAINTENANCE WORK ON THE RAT SYSTEM.

CAUTION : DO NOT LIFT TURBINE ASSEMBLY BY TURBINE BLADES OR ALLOW TURBINE ASSEMBLY TO REST ON TURBINE BLADES DURING REMOVAL FROM AIRCRAFT.

CAUTION : INSTALL TURBINE BLADE AND TURBINE ASSEMBLY PROTECTIVE COVERS WHENEVER THE RAT IS REMOVED FROM THE AIRCRAFT.

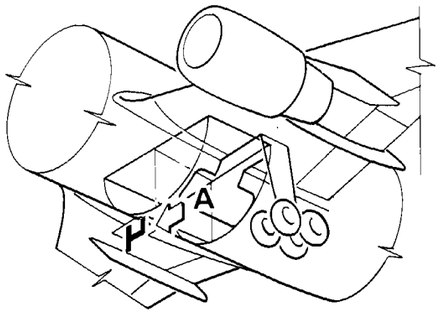
NOTE : Discard all removed seals.

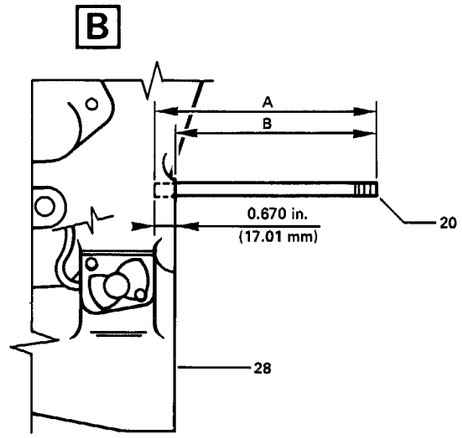
(1)Remove cotter pin (10) from nut (15).
(2)Remove nut (15), washer (14) and bolt (9).
(3)Remove the two bolts (18) and washers (19). Remove door bracket assembly (21).
(4)Remove nut (16) from stud (20). Remove washer (17).
(5)Remove the two bolts (23) and washers (24).
(6)Remove hydraulic pump (22) from strut housing assembly (28).
(7)Remove flat washer (7), tube (3), flat washer (2) and shim (1) from stud (20).
(8)Remove supply transfer tube (8) and pressure transfer tube (32) from strut housing assembly (28).
(9)Remove backup retainers (4), (6) and (11), (13) and O-rings (5) and (12) from supply transfer tube (8).
(10)Remove backup retainers (29), (31) and (33), (35) and O-rings (30) and (34) from pressure transfer tube (32).
(11)Remove stud (20) from strut housing assembly (28).
(12)Remove retainer insert (26) from strut housing assembly (28).
(13)Remove O-rings (25) and (27) from insert retainer (26).

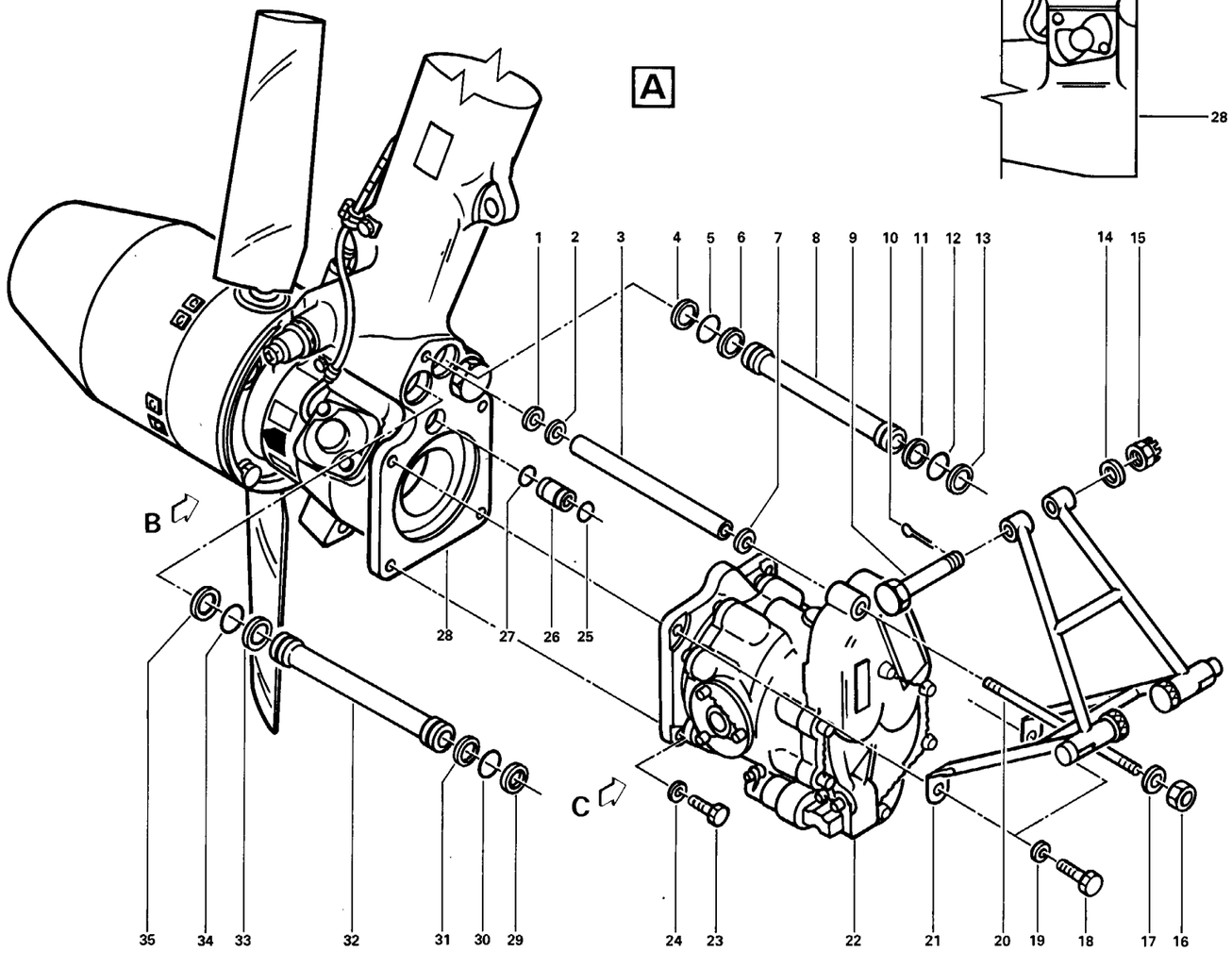
C. Preparation of Replacement Component.

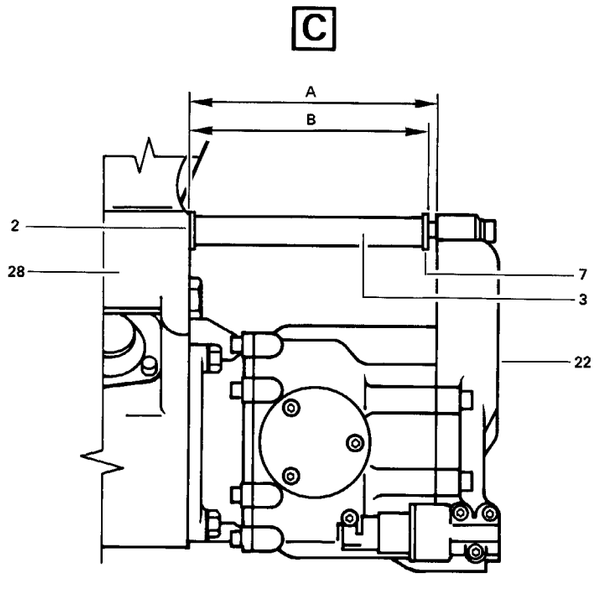
WARNING : MATERIAL No. 04-015 IS TOXIC. DO NOT BREATHE VAPORS. USE IN WELL VENTILATED AREA FREE FROM SPARKS, FLAME, OR HOT SURFACES. WEAR SPLASH GOGGLES, SOLVENT-RESISTANT GLOVES, AND OTHER PROTECTIVE GEAR. IN CASE OF EYE CONTACT, FLUSH WITH WATER AND SEEK MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, WASH WITH SOAP AND WATER.

(1)Lightly lubricate O-rings (5), (12), (25), (27), (30) and (34) with









BM5 29 25 28 4 AAMO – 18

RAT Hydraulic Pump
Figure 401

Material No. 04-015.
(2)Install O-rings (5), (12) and backup retainers (11), (13) and (4), (6) on supply transfer tube (8).
(3)Install O-rings (30), (34) and backup retainers (29), (31) and (33), (35) on pressure transfer tube (32).
(4)Install O-rings (25) and (27) on insert retainer (26).

D. Installation
(1)Install stud (20) in strut housing assembly (28) as per detail B.
(a)Measure and record dimension A, length of stud (20).
(b)Determine dimension B of stud (20) to be above surface of strut housing assembly (28) as follows :
B = A - 0.670 in. (17.01 mm)
(2)Determine shim (1) thickness as per detail C.
(a)Install tube (3) and washers (2) and (7) on stud (20).
(b)Attach hydraulic pump (22) to strut housing assembly (28) using bolts (18) and (23) washers (17), (19) and (24) and nut (16). Hand tighten bolts and nut.
(c)Measure distance from tube (3) location on hydraulic pump (22) housing to tube mating location on strut housing assembly (28). Record as dimension A.
(d)Measure total length of tube (3) and washers (2) and (7). Record as dimension B.
(e)Remove hydraulic pump (22) from strut housing assembly (28) by removing bolts (18) and (23), washers (17), (19) and (24), and nut (16).
(f)Remove tube (3) and washers (2) and (7) from stud (20).
(g)Determine shim (1) thickness as follows :
- Shim thickness = A - B.
NOTE : Shim tolerance to be 0.000/- 0.002 in.
(0.000/- 0.050 mm).
(3)Install shim (1) flat washer (2), tube (3) and flat washer (7) on stud (20).
(4)Install supply transfer tube (8) and pressure transfer tube (32) in strut housing assembly (28).
(5)Install insert retainer (26) in strut housing assembly (28).
(6)Position hydraulic pump (22) and door bracket assembly (21) on strut housing assembly (28).
NOTE : Make certain that ends of tube, supply transfer tube and pressure transfer tube are seated in hydraulic pump ports.
(7)Position washer (17) and nut (16) on stud (20). Do not TORQUE at this stage.
(8)Secure hydraulic pump (22) and lower mounting brackets of door bracket assembly (21) to strut housing assembly (28) with washers (19) and bolts (18). Do not TORQUE at this stage.
(9)Position washer (24) and bolt (23). Do not TORQUE at this stage.
(10)Install upper mounting bracket of door bracket assembly (21) in strut housing assembly (28) clevis.
(11)Secure upper mounting bracket of door bracket assembly (21) to strut housing assembly (28) with bolt (9), washer (14), and nut (15). TORQUE nut to between 20 and 40 lbf.ft (2.71 and 5.42 m.daN).

(12)TORQUE bolts (18) and (23) to between 20 and 22 lbf.ft (2.71 and 2.98 m.daN).
(13)TORQUE nut (16) to between 20 and 22 lbf.ft (2.71 and 2.98 m.daN).

E. Test

R (1)Do the manual blade (governor) twist test.
R (a)Manually turn both RAT blades carefully to the fine-pitch stop position (twisting range approx. 51 degrees) against the spring pressure, grasping each blade near the blade root. Quickly release the blades and let the spring pressure push the blades to the coarse-pitch position. Do this action three times and make sure that the blades go back to the hard stop at the full coarse-pitch position.
R (b)Replace the turbine assembly if the blades do not touch the hard stop at the full coarse-pitch position (Ref. 29-25-37, P. Block 401).
R (2)Perform RAT functional test (Ref. 29-25-00, P. Block 501).

F. Close-Up

(1)Pressurize Yellow system reservoir (Ref. 29-14-00, P. Block 301).
(2)Check level of system reservoir, top up if required (Ref. 12-12-29, P. Block 1).
(3)In RAT extension area.
(a)Remove safety barriers.
(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove all ground handling and maintenance equipment, standard and special tools, together with all access equipment, miscellaneous items and warning notices.
(5)Bleed cargo compartment door hydraulic system (Ref. 52-33-00, P. Block 1).
(6)Close circuits breakers 7GX and 6GL.
(7)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(8)Close cargo compartment doors if no other work is in progress (Ref. 52-33-00, P. Block 1).
(9)Close access door 671DB.
(10)In flight compartment, lead seal RAT control handle.

RAT GROUND CHECK OUT MODULE 293027 - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR AND THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
POSITION SAFETY BARRIERS AND DISPLAY WARNING NOTICES AROUND RAT EXTENSION AREA.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Cart - Hydraulic Ground Power Supply
B.	Compressed Air Source
C.	Access Platform, 2.6 m (8 ft. 7 in.)

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Main Hydraulic Power Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
R - 29-25-37, P. Block 401	Turbine Assembly - Removal/Installation
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 52-33-00, P. Block 1	Cargo Compartment Doors

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1) Make certain that cargo compartment doors are open, open them if they are to be used while aircraft is on ground (Ref. 52-33-00, P. Block 1). Position warning notices prohibiting closing of doors.

(2) Position safety barriers and warning notices around ram air turbine (RAT) extension area.

(3) In flight compartment, on HYD PWR panel 427VU, make certain that hydraulic power is in the following configuration :

(a) ELEC PUMPS pushbutton switch released (out).

(b) Yellow system PTU pushbutton switch released (out).

(c) PUMPS ENG 1 and PUMPS ENG 2 pushbutton switches released (out).

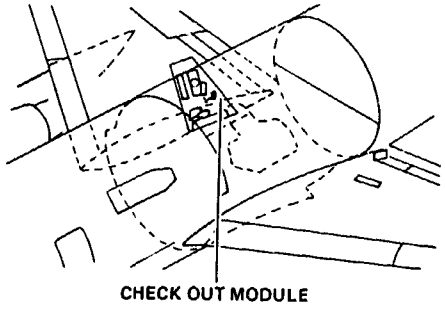
(4) Display a warning notice prohibiting operation of Yellow system.

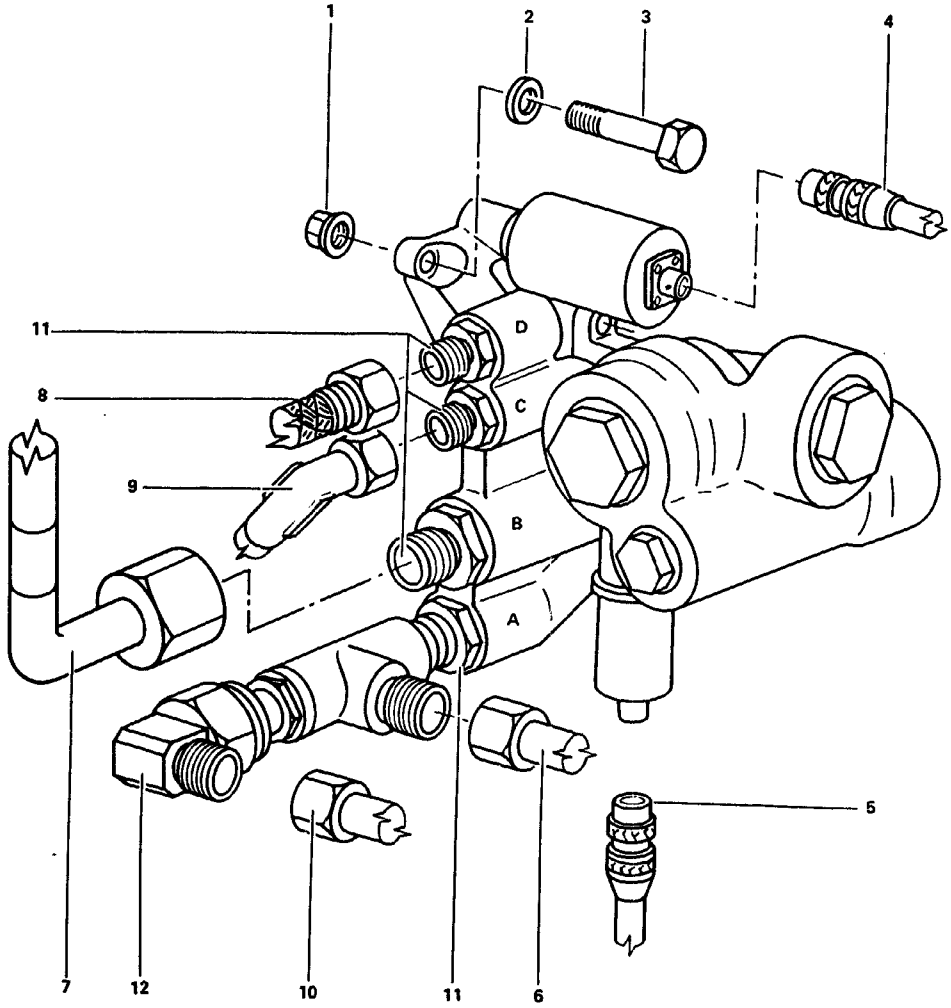
(a) In flight compartment, on HYD PWR panel 427VU.

(b) On Yellow system ground connectors.

(5) In flight compartment, extend RAT (Ref. 29-25-00, P. Block 301).

(6) Open, safety and tag the following circuit breakers.





BM5 29 25 29 4 AAMO – 12

Check out Module 3027
Figure 401

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	HYDRAULIC/PTU CTL/G/Y	6GL	332/U60

(7)Open Green system ground connector access door 147AL. Display a warning notice on reservoir filling manual selector prohibiting filling of Yellow reservoir.
(8)Open right main gear main door (Ref. 32-12-11, P. Block 301).
(9)Install access platform at zone 671.
(10)Open access door 671DB.
(11)Depressurize Yellow system (Ref. 29-10-00, P. Block 301).
(12)Depressurize Yellow reservoir (Ref. 29-14-00, P. Block 301).
(13)Display a warning notice on ground connectors prohibiting pressurization of Yellow system.
(14)Display a warning notice prohibiting use of hand pump.

B. Removal

NOTE : Install blanking cap/plug on all removed hydraulic lines. Discard all removed seals. Install dust caps on pressure switch and solenoid valve.

(1)Disconnect the two electrical connectors (4) and (5) from check-out module 3027.

WARNING : MAKE CERTAIN THAT HYDRAULIC SYSTEM IS NOT UNDER PRESSURE BEFORE PERFORMING ANY MAINTENANCE WORK ON THE RAT SYSTEM.

NOTE : Be prepared to catch up to 1 pint of hydraulic fluid when hydraulic lines are removed.

(2)Disconnect suction line (6) connecting Yellow reservoir to check-out module 3027 (Mark A on check-out module).
(3)Disconnect return line (7) connecting pivoted leg swivel joint to check-out module 3027 (Mark B on check-out module).
(4)Disconnect delivery hose (8) 1.6m check-out module 3027 (Mark D on check-out module).
(5)Disconnect ram air pressure line (9) connecting swivel joint to check-out module 3027 (Mark C on check-out module).
(6)Disconnect line (10) from elbow (12).
(7)Remove the three self-locking nuts (1) and discard. Retain bolts (3) and washers (2).
(8)Remove check-out module.

C. Preparation of Replacement Component

(1)Remove connections (11) from removed check-out module and note their installation position.
(2)Fit new seals on connections and correctly install them on replacement component.

D. Installation

(1)Position check-out module 3027 in its housing.
(2)Install bolts (3), washers (2) and handtighten new self-locking nuts (1)

to facilitate hydraulic lines positioning.

(3)Remove blanking cap/plug and connect ram air pressure line (9) to check-out module (Mark C on check-out module).

(4)Remove blanking cap/plug and install return line (7) connecting check-out module 3027 to swivel joint (Mark B on check-out module).

(5)Remove blanking cap/plug and install suction line (6) connecting check-out module 3027 to Yellow reservoir (Mark A on check-out module).

(6)Connect line (10) to elbow (12).

(7)Connect a hose to check-out module delivery port to bleed component (Mark D on check-out module) and place other end in a container.

(8)Remove warning notice and pressurize hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(9)Bleed check-out module 3027 then remove bleeder hose.

(10)Connect delivery hose (8) (Mark D on check-out module).

(11)Check that connections are correctly tightened and tighten self-locking nuts (1).

(12)Perform following steps to make certain that there is no air in hydraulic system :

(a)Make certain that air pressure in Yellow hydraulic reservoir is not less than 3.5 bars (50 psi). If necessary, pressurize reservoir (Ref. 29-14-00, P. Block 301).

(b)On Yellow reservoir hydraulic quantity transmitter, record position of fluid level pointer.

(c)Depressurize Yellow hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(d)On Yellow hydraulic quantity transmitter, record movement of fluid level pointer.

NOTE : Movement of pointer shows an increase of fluid level in reservoir because of air expansion in system.

(e)If movement of pointer between pressurized and depressurized conditions is more than :

- 1.5 liters for Yellow system.

repeat bleeding procedure until result is satisfactory.

(13)Remove dust caps and connect the two electrical connectors (4) and (5) to check-out module.

(14)Top up Yellow reservoir (Ref. 12-12-29, P. Block 301).

E. Tests

R (1)Do the manual blade (governor) twist test.

R (a)Manually turn both RAT blades carefully to the fine-pitch stop position (twisting range approx. 51 degrees) against the spring pressure, grasping each blade near the blade root. Quickly release the blades and let the spring pressure push the blades to the coarse-pitch position. Do this action three times and make sure that the blades go back to the hard stop at the full coarse-pitch position.

R (b)Replace the turbine assembly if the blades do not touch the hard stop at the full coarse-pitch position (Ref. 29-25-37, P. Block 401).

R (2)Perform functional test (Ref. 29-25-00, P. Block 501, Para. 2).

R (3)Retract RAT in its stowage compartment (Ref. 29-25-00, P. Block 301).

F. Close-Up

(1)Remove all warning notices.
(2)Remove safety clips and tags and close circuits breakers 7GX and 6GL.
(3)Close cargo compartment doors (Ref. 52-33-00, P. Block 1).
(4)Close access doors 671DB and 147AL.
(5)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(6)Close right main gear main door (Ref. 32-12-11, P. Block 301).

RAT EJECTION JACK (293855) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
POSITION SAFETY BARRIERS AND DISPLAY WARNING NOTICES AROUND RAT EXTENSION AREA.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Safety Barriers
B.	Access Platform, 2.60 m (8 ft. 8 in.)
C. Material No. 04-004	Common Greases (Ref. 20-31-00)
D.	Warning Notices
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)

2. Procedure (Ref. Fig. 401)

A. Job Set-Up
(1)Position safety barriers and display warning notices around RAT extension area.
(2)In flight compartment, extend RAT (Ref. 29-25-00, P. Block 301).
(3)Position access platform at zone 671.
(4)In zone 144, display a warning notice on electrical connector 142VC to prohibit connection of RAT test set.

B. Removal
(1)Remove cotter pins (5), the four nuts (4), and the four washers (3) from jack mounting gimbal (2).
(2)Remove cotter pin, nut (8) and washer (7) from jack piston rod hinge bolt (9).
(3)Disassemble and remove jack mounting gimbal (2).
(4)Hold jack, remove hinge bolt (9) of jack rod, remove jack and retain washer (7).

C. Preparation of Replacement Component
(1)Clean structural hinge points (1)
(2)On replacement jack :
(a)Check jack rod travel (Ref. 29-25-00, P. Block 501).
R (b)Lubricate trunnions (6) with Material No.04-004.
(3)Lubricate trunnion bores in gimbal (2).
(4)Lubricate gimbal mounting bolts (1).

D. Installation
(1)Position jack in RAT stowage compartment, with charging valve (10) towards front of aircraft.
(2)Position jack rod eye bolt in RAT lever fork end.
Install bolt (9) washers (7) and nut (8). Torque to between 2.8 and

and 4.5 m.daN (20.7 and 33.2 lbf. ft), and install cotter pin.

(3)Assemble the two RAT gimbal halves on jack trunnions (6) and on mounting bolts (1).

(4)Assemble the two RAT gimbal halves with the four bolts (11), washers (3) and nuts (4). Install cotter pins (5).

(5)Should any adjustment be necessary, adjust RAT extension jack (Ref. 29-25-00, P. Block 501).

R (6)Replenish RAT jack with fluid (Ref. 12-12-29, P. Block 1).

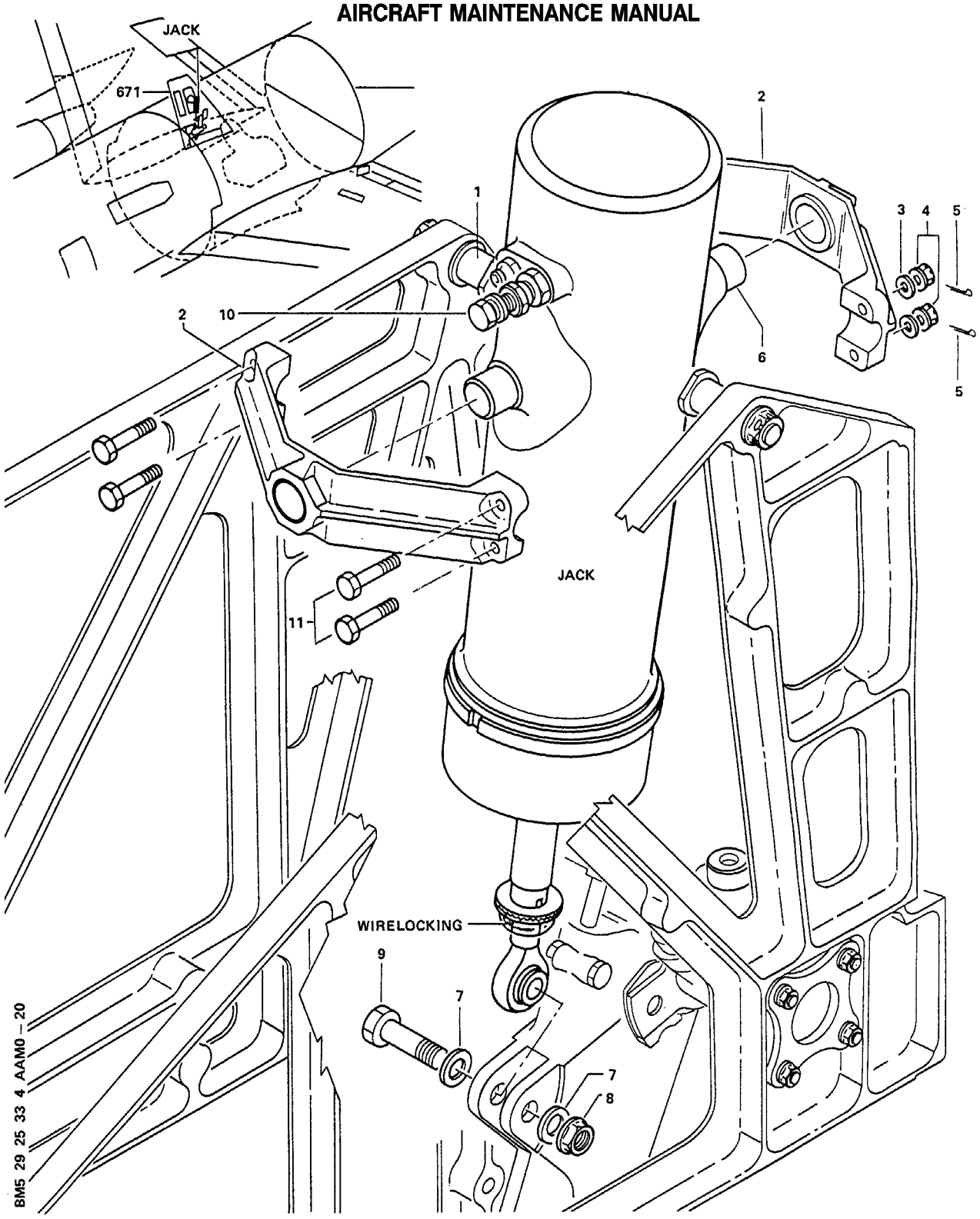
E. Tests

(1)Extend and retract RAT (Ref. 29-25-00, P. Block 301) and adjust if required (Ref. 29-25-00, P. Block 501).

F. Close-Up

(1)Retract RAT (Ref. 29-25-00, P. Block 301). Close RAT stowage compartment doors.

(2)Remove all ground handling and maintenance equipment, standard and special tools together with ground power and replenishing equipment, all access equipment and miscellaneous items.



RAT Ejection Jack
Figure 401

RAM AIR TURBINE DOORS (MAINTENANCE PROCEDURE ONLY) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 6 in.)
B. 98A29201000000	Pin-Rigging, RAT Drop Out Controls
C. Not applicable	
Referenced Procedures	
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)

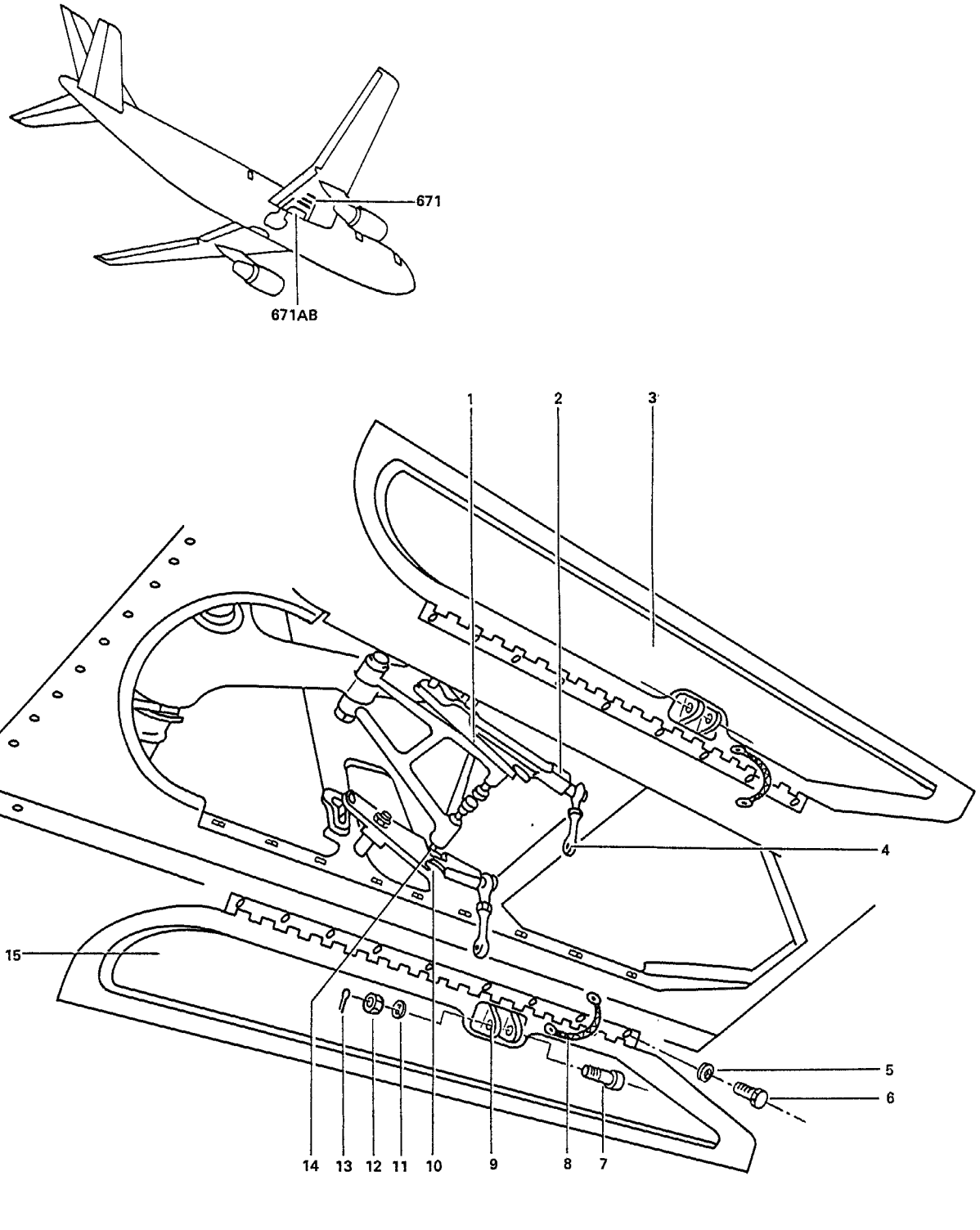
2. Procedure

A. Job Set-Up
(Ref. Fig. 401, 402)
(1)In flight compartment, make certain that RAT control handles are in their housing. Display warning notices prohibiting operation of RAT.
(2)Install access platform under zone 671.
(3)Display a warning notice prohibiting connection of RAT test set to connector 142VC located in zone 144.
R (4)Remove access door 671GB.
(5)Insert rigging pin 98A29201000000 in uplock unit actuating lever.
(6)Open RAT doors by pulling door-release pin knurled knobs (1).
WARNING : BEFORE PROCEEDING WITH ANY WORK ON RAT MAKE CERTAIN THAT UPLOCK UNIT ACTUATING LEVER RIGGING PIN IS CORRECTLY INSERTED.

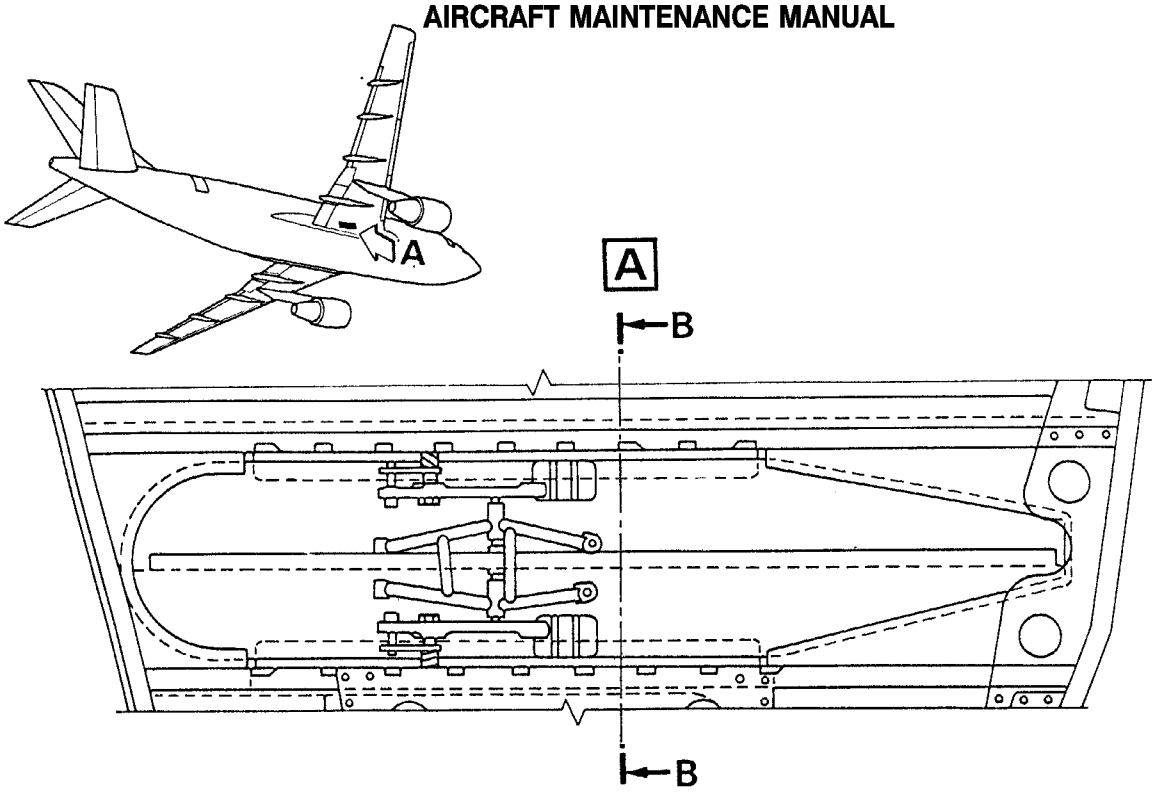
B. Removal
(1)From each door, remove bolt (7) attaching link rod (4) to fork fitting. Retain bolt (7), washer (11), bushes (9) and nut (12). Discard cotter pin (13).
(2)Remove the screws (6) attaching RAT doors to structure, and retain washers (5).

C. Preparation of Replacement Component
Install bonding strips (8) on replacement doors.

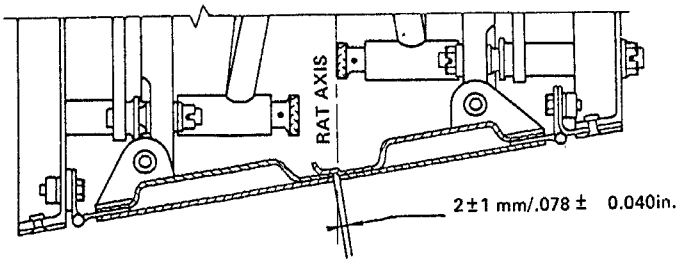
D. Installation
NOTE : Installation procedure is identical for left and right doors. However for reasons of door closure sequence the right door shall be installed and adjusted first.
(1)Position right door (3) and its bonding strip (8).
(2)Install washers (5), screws (6) and tighten.
(3)Position rod end (4) in door fork fitting.
Install bolt (7), bushes (9), washer (11) and nut (12).
Tighten and install cotter pin (13).
(4)Position left door (15) and its bonding strip (8).
Install washers (5) and screws (6) and tighten.
(5)Position rod end (4) in door fork fitting. Install bolt (7), bushes (9), washer (11) and nut (12). Tighten and install cotter pin (13).



RAT Doors
Figure 401



SECTION
B-B



BM5 29 25 34 4 ACM0 – 20

Fits and Clearances
Figure 402

(6)Make certain that the door-release pins are in the retracted locked position.
(7)Release door, release pin (14), un lock and close right door. During closing, check that door release pin (14) is correctly engaged into actuating lever (2) lips at the end of door travel.
(8)In this configuration, the right RAT stowage compartment door must be in contact with wing lower surface skin. If necessary. adjust length of link rod (4) to obtain this result (Ref. 29-25-00, P. Block 501).
(9)Release door, release pin (14), unlock and close left door. During closing, check that door release pin (14) is correctly engaged into actuating lever (10) lips at the end of door travel.
(10)In this configuration, the left RAT stowage compartment door must be in contact with wing lower surface skin. If necessary, adjust length of link rod (4) to obtain this result (Ref. 29-25-00, P. Block 501).
(11)Check door peripheral gap 2 ± 1 mm (.078 ± 0.4 in.).
Gap values need not be constant.

E. Tests
(1)Not applicable.
(2)Remove rigging pin 98A29201000000 from RAT uplock unit actuating lever.
(3)Perform extension and retraction of RAT (Ref. 29-25-00, P. Block 301).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close RAT doors.
R (3)Install access door 671GB.
(4)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(5)Remove warning notices.

WARNING : MAKE CERTAIN THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

POSITION SAFETY BARRIERS AND WARNING NOTICES AROUND RAT EXTENSION AREA

R

R 1. Reason for the Job

R Replacement of filter element.

R 2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.60 m (8 ft. 5 in.)
B.	Safety Barriers
C.	Warning Notices
D.	Medium-Bristled Brush
E. BLS34529	Assembly Bullet
F. DAS34530	Sizing Die
G. Material No. 04-015	Common Greases (Ref. 20-31-00)
H. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
or	
Material No. 11-006	Cleaning Agents (Ref. 20-31-00)
I. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
J. Material No. 12-006	Strippers (Ref. 20-31-00)
K. Material Alkaline Cleaner	Specification P-C-436 (Local Purchase)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-27, P. Block 401	Ram Air Turbine
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors

R 3. Procedure

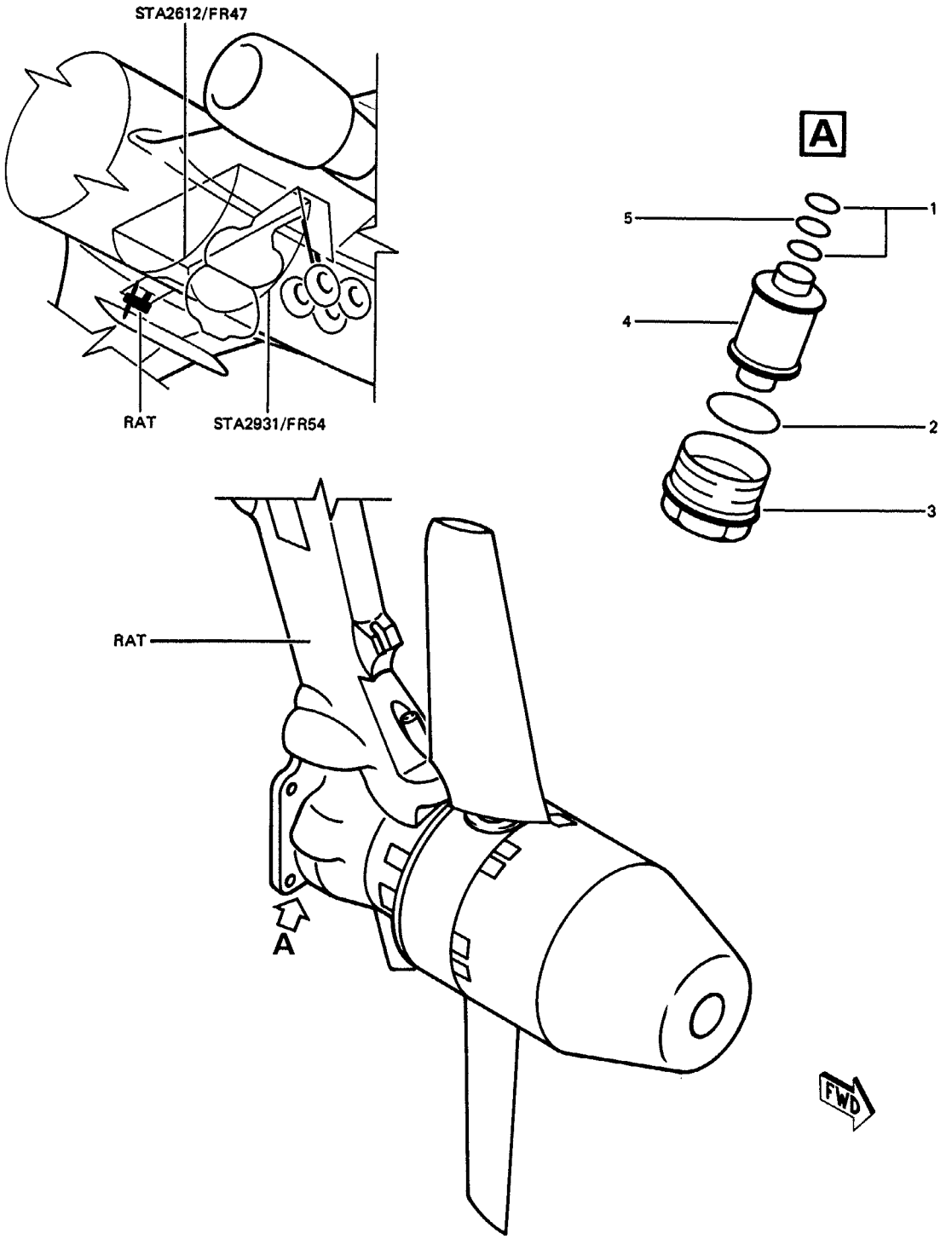
(Ref. Fig. 301)

R A. Job Set-Up

R (1)Install access platform under RAT stowage compartment door.

(2)Install safety barriers around work area.

(3)In flight compartment, extend RAT by pulling one of the two control handles (Ref. 29-25-00, P. Block 301).



Filter Element
Figure 301

(4)Display a warning notice on connector 142VC in zone 144 prohibiting connection of RAT test set.

R (5)Make certain that cargo compartment doors are open. If not, open them if they are to be used while aircraft is on ground. (Ref. 52-30-00, P. Block 301).

(6)In flight compartment, on HYD PWR panel 427VU, make certain hydraulic

R power is in the following configuration:

(a)ELEC PUMPS pushbutton switch released (out).

(b)Green/Yellow PTU pushbutton switch released (out).

R (7)Display warning notices prohibiting operation of Yellow hydraulic system:

(a)In flight compartment, on HYD PWR panel 427VU.

(b)On Yellow system ground connectors.

R (8)Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
133VU	RAT/TEST	1GF	331/V59

R (9)Depressurize Yellow hydraulic system (Ref. 29-10-00, P. Block 301).

R (10)Depressurize Yellow system reservoir (Ref. 29-14-00, P. Block 301).

B. Removal

(1)Install container under filter to be removed.

(2)Cut and remove lockwire and remove filter head (3).

(3)Discard O-ring (2).

(4)Remove filter element (4).

NOTE : If the oil filter shows bright metal deposits that can be clearly defined as chunks or pieces caused by breakage (in contrast to minute flakes or slivers caused by normal wear) or if bright metal deposits are present in considerable quantity on the filter element, remove RAT, (Ref. 29-25-27, P. Block 401) and send to overhaul facility.

(5)Remove back-up retainer (1) and seal (5) from filter element.

R (6)Clean filter element (4) as follows:

CAUTION : FAILURE TO PLUG CENTER OF ELEMENT CAN RESULT IN CONTAMINATION OF FILTER INTERIORS. FLOW THROUGH THE FILTERS IS FROM THE OUTSIDE TO THE INSIDE, THE INTERIOR BEING THE CLEAN SIDE.

(a)Plug center of filter element with tapered Teflon plugs.

WARNING : MATERIAL NO. 11-002 IS TOXIC AND FLAMMABLE. DO NOT BREATHE VAPORS.
USE IN WELL VENTILATED AREA FREE FROM SPARKS, FLAME, OR HOT SURFACES. WEAR SPLASH GOGGLES, SOLVENT-RESISTANT GLOVES, AND OTHER PROTECTIVE GEAR. IN CASE OF EYE CONTACT, FLUSH WITH WATER AND SEEK MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, WASH WITH SOAP AND WATER.

(b)Immerse filter element in a bath containing Cleaning Agents (Material No. 11-002). Agitate briefly to remove all loose contamination.

(c)Remove filter element from Cleaning Agents (Material No. 11-002) and allow filter element to drain free of solvent.

WARNING : MATERIAL No. 12-006 IS TOXIC. DO NOT BREATHE VAPORS.

USE IN WELL VENTILATED AREA FREE FROM SPARKS, FLAME, OR HOT SURFACES. WEAR SPLASH GOGGLES, SOLVENT-RESISTANT GLOVES, AND OTHER PROTECTIVE GEAR. IN CASE OF EYE CONTACT, FLUSH WITH WATER AND SEEK MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, WASH WITH SOAP AND WATER.

(d)If a hard sludge deposit remains, soak filter element for 30 minutes in carbon removing Strippers (Material No. 12-006).

R (e)Remove filter element from solvent bath and rinse thoroughly in clean, R hot water.

R (f)Dip filter element in Cleaning Agents (Material No. 11-002) and brush R with a medium-bristled brush.

R (g)Rinse filter element thoroughly in Cleaning Agents (Material R No. 11-002).

R WARNING : WHEN USING COMPRESSED AIR FOR CLEANING OR DRYING, REGULATE R PRESSURE TO 29 POUNDS PER SQUARE INCH OR LESS. WEAR GOGGLES R OR FACE SHIELD TO PROTECT EYES.

R (h)Dry filter element with clean, dry compressed air.

R (i)Remove teflon plugs from center of filter element.

R (j)An ultrasonic cleaner may be used as an alternative to steps (f), (g) R and (h) as follows:

R WARNING : ALKALINE CLEANER (P-C-436) IS CORROSIVE TO HUMAN TISSUE. R DO NOT BREATHE VAPORS. USE IN WELL VENTILATED AREA. WEAR R CHEMICAL-RESISTANT CLOTHING, GLOVES, SPLASH GOGGLES, AND R FACE SHIELD. IN CASE OF EYE OR SKIN CONTACT, FLUSH WITH R WATER AND SEEK MEDICAL ATTENTION.

R 1 Suspend filter element in an ultrasonic tank filled with alkaline R cleaner solution.

R NOTE : Alkaline cleaner is to be mixed in a ratio of 5 ounces R (140 grams) to 1 gallon (4.5 liters) of water.

R WARNING : WEAR INSULATED GLOVES AND OTHER SUITABLE PROTECTION WHEN R HANDLING HEATED PARTS.

R 2 Agitate filter element for 10 minutes at 160° ± 5 F. R (71° ± 2°C).

R 3 Remove filter element from ultrasonic tank. Rinse filter element R thoroughly in clean, hot water.

R 4 Dry filter element in an oven preheated to 150° ± 5 F. R (66° ± 2°C).

R C. Preparation of Replacement Component

R (1)Clean filter (3) and dry using Cleaning Agents (Material No.11-003) or R (Material No.11-006) and dry compressed air.

R WARNING : MATERIAL NO. 04-015 IS TOXIC. DO NOT BREATHE VAPORS. USE IN R WELL VENTILATED AREA FREE FROM SPARKS, FLAME, OR HOT SURFACES. R WEAR SPLASH GOGGLES, SOLVENT-RESISTANT GLOVES, AND OTHER R PROTECTIVE GEAR. IN CASE OF EYE CONTACT, FLUSH WITH WATER AND R SEEK MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, WASH WITH SOAP R AND WATER.

R (2)Lightly lubricate seal (5) with Common Greases (Material No. 04-015).

R (3)Using assembly bullet BLS34529 install backup retainers (1) and seal (5) R on filter element (4).

R (4)Using sizing die DAS34530, size backup retainers (1) on filter element

R (4).

R D. Installation
R (1)Install filter element (4) in its housing.
R (2)Install new O-ring (2) on filter head (3). Lubricate O-ring with Common Greases (Material No. 04-015).
R (3)Install filter head (3), and TORQUE to between 20 and 25 lbf.ft. (2.72 and 3.4 m.daN).
R (4)Top up, if required (Ref. 12-12-29, P. Block 1).

R E. Test
R (1)Pressurize Yellow system reservoir and Yellow hydraulic system (Ref. 29-14-00, P. Block 301) (Ref. 29-10-00, P. Block 301).
R (2)Close circuit breaker 1GF.
R (3)Check RAT filter for leakage.
R (4)Safety filter head with lockwire.

R F. Close-Up
R (1)Retract RAT in its stowage compartment (Ref. 29-25-00, P. Block 301).
R (2)Remove all ground handling and maintenance equipment, standard and special tools together with ground power and replenishing equipment, all access equipment and miscellaneous items.

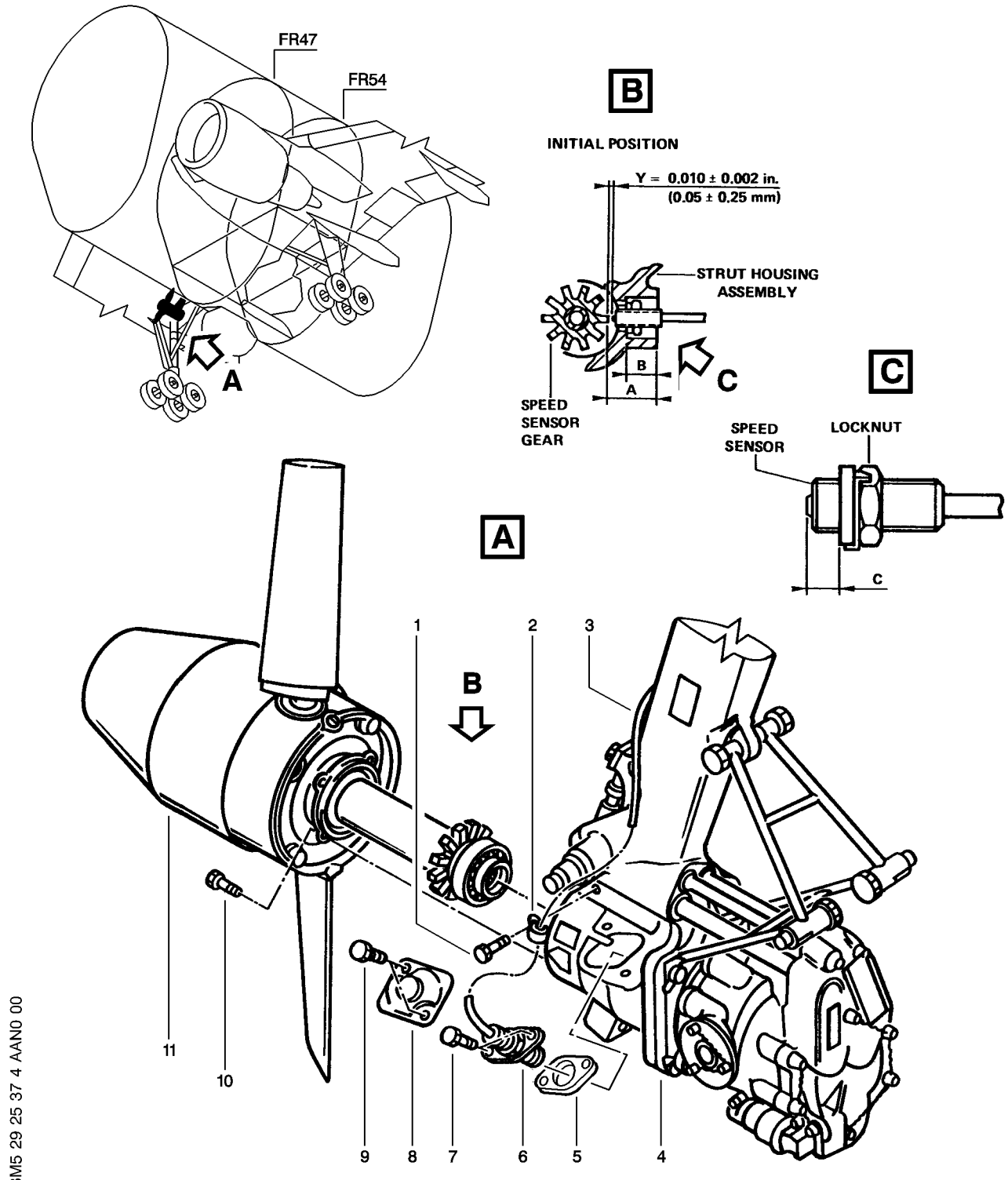
WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. POSITION SAFETY BARRIERS AND DISPLAY WARNING NOTICES AROUND RAT EXTENSION AREA.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 7 in.)
B.	Safety Barriers
C.	Micrometer - Depth
D. WAS33662	Special Wrench
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-25-00, P. Block 301	Yellow Auxiliary Power (Ram Air Turbine)
- 29-25-00, P. Block 501	Yellow Auxiliary Power (Ram Air Turbine)
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 52-33-00, P. Block 1	Cargo Compartment Door Hydraulic System

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open right main gear main door (Ref. 32-12-11, P. Block 301). Install safety collars.
(2)Install access platform under Ram Air Turbine extension door.
(3)Make certain that cargo compartment doors are open, open them if they are to be used while aircraft is on ground (Ref. 52-33-00, P. Block 1). Display warning notices on access doors to selectors prohibiting closure of cargo compartments doors.
(4)In flight compartment, extend RAT (Ref. 29-25-00, P. Block 301).
(5)In flight compartment, on HYD PWR panel 427VU, make certain that hydraulic power is in the following configuration.
(a)ELEC PUMPS pushbutton switch released (out).
(b)Yellow system PTU pushbutton switch released (out).
(c)PUMPS ENG1 and PUMPS ENG2 pushbutton switches released (out).
(6)Display a warning notice prohibiting operation of Yellow system :
(a)In flight compartment, on HYD PWR panel 427VU.
(b)On Yellow system ground connectors.
(7)Open, safety and tag the following circuit breakers :



Turbine Assembly
Figure 401

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS/CTL & /CARGO DOOR/PUMP	7GX	333/T51
133VU	PTU CTL/G/Y	6GL	332/U60

R (8)Open Green system ground connector access door 147AL. Display a warning
R notice on reservoir filling manual selector prohibiting filling of Yellow
R reservoir.
R (9)Open access door 671DB.
(10)Depressurize Yellow system (Ref. 29-10-00, P. Block 301).
(11)Display a warning notice on ground connectors prohibiting pressurization of Yellow system.
(12)In hydraulic compartment, display a warning notice prohibiting use of hand pump.
(13)Depressurize Yellow system reservoir (Ref. 29-14-00, P. Block 301).

B. Removal

WARNING : MAKE CERTAIN THAT HYDRAULIC SYSTEM IS NOT UNDER PRESSURE BEFORE PERFORMING ANY MAINTENANCE WORK ON THE RAT SYSTEM.

CAUTION : DO NOT LIFT TURBINE ASSEMBLY BY TURBINE BLADES OR ALLOW TURBINE ASSEMBLY TO REST ON TURBINE BLADES DURING REMOVAL FROM AIRCRAFT.

CAUTION : INSTALL TURBINE BLADE AND TURBINE ASSEMBLY PROTECTIVE COVERS WHENEVER THE RAT IS REMOVED FROM THE AIRCRAFT.

(1)Remove the two screws (9) and remove speed sensor cover (8).
(2)Remove screw (1) and clamp (2) to free cable (3).
(3)Remove the two screws (7) and remove speed sensor (6) from strut housing assembly (4).
(4)Using wrench, remove screws (10).
(5)Remove turbine assembly (11).

C. Installation

CAUTION : DO NOT LIFT TURBINE ASSEMBLY BY TURBINE BLADES OR ALLOW TURBINE ASSEMBLY TO REST ON TURBINE BLADES DURING INSTALLATION ON AIRCRAFT.

(1)Position turbine assembly (11) in strut housing assembly (4) and secure with screws (10).
TORQUE screws to between 51 and 56 lbf.in. (0.57 and 0.63 m.daN).
(2)Determine clearance between speed sensor and speed sensor gear (Ref. details B and C).
(a)Using a depth micrometer measure from strut housing assembly surface to speed sensor gear tooth end. Record as dimension A.
(b)Measure and record dimension B.
(c)Determine depth (dimension C) to which speed sensor must be installed into strut housing assembly to obtain dimension noted by Y as follows : C ± 0.002 in. (0.05 mm) = (A-B) -0.010 in. (0.25 mm).
(d)Measure and record dimension C of speed sensor removed from strut housing assembly.
(e)If necessary, adjust locknut on speed sensor to obtain dimension C as

determined above. TORQUE locknut to between 10 and 15 lbf.ft. (1.35 and 2.03 m.daN).

NOTE : If dimension C is not obtained after locknut adjustment, adjust with shims (5).

(3)Position speed sensor (6) equipped with two screws (7) in strut housing assembly (4).
TORQUE screws to between 17 and 19 lbf.in. (0.19 and 0.21 m.daN).

(4)Position speed sensor cover (8) equipped with two screws (9). TORQUE screws to between 29 and 32 lbf.in. (0.32 and 0.36 m.daN).

NOTE : Slowly rotate turbine assembly (11) to be sure that clearance between speed sensor and speed sensor gear has been maintained. If there is contact between speed sensor and speed sensor gear, disassemble and readjust clearance between speed sensor and speed sensor gear (Para 2, C, (2).).

(5)Install clamp (2) equipped with cable (3).
Tighten screw (1).

D. Test

R (1)Do the manual blade (governor) twist test.
R (a)Manually turn both RAT blades carefully to the fine-pitch stop position (twisting range approx. 51 degrees) against the spring pressure, grasping each blade near the blade root. Quickly release the blades and let the spring pressure push the blades to the coarse-pitch position. Do this action three times and make sure that the blades go back to the hard stop at the full coarse-pitch position.
R (b)Replace the turbine assembly if the blades do not touch the hard stop at the full coarse-pitch position (Ref. paragraph 2.).
R (2)Perform RAT functional test (Ref. 29-25-00, P. Block 501).

E. Close-Up

(1)Pressurize Yellow system reservoir (Ref. 29-14-00, P. Block 301).
(2)Check level of Yellow reservoir, top up if required (Ref. 12-12-29, P. Block 1).
(3)In RAT extension area.
(a)Remove safety barriers.
(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove all ground handling and maintenance equipment, standard and special tools, together with all access equipment, miscellaneous items and warning notices.
(5)Bleed cargo compartment doors hydraulic system (Ref. 52-33-00, P. Block 1).
(6)Close circuits breakers 7GX and 6GL.
(7)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(8)Close cargo compartment doors if no other work is in progress (Ref. 52-33-00, P. Block 1).
(9)Close access door.
(10)In flight compartment, lead seal RAT control handle.

INDICATING - DESCRIPTION AND OPERATION

1. General

Hydraulic system parameter and failure indicating is achieved by means of :

A. Indicators and visual warnings on the following panels and CRT display units :
(1) Overhead panel 427VU
(2) Two lights on each Captain and First Officer instrument panel :
MASTER WARN (Red) and MASTER CAUTION (Amber)
(3) Lateral panel
(4) Left and right ECAM display units.

B. Aural Warnings

HYDRAULIC QUANTITY INDICATING - DESCRIPTION AND OPERATION

1. General

A hydraulic quantity transmitter on each reservoir provides the following information :

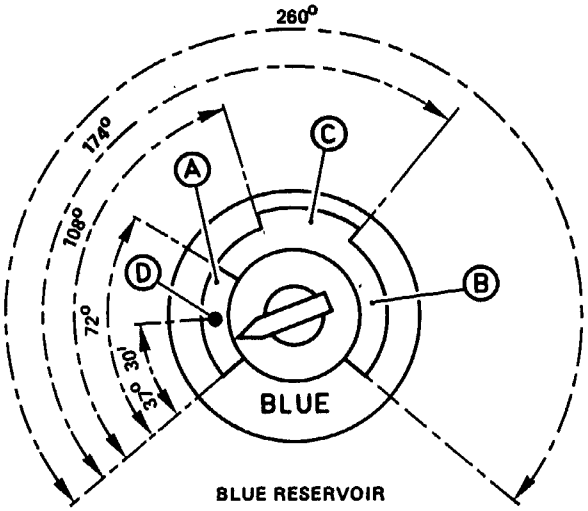
- Quantity, on the transmitter direct reading quantity gage
- Quantity, on the associated hydraulic quantity indicator in the flight compartment, on overhead panel 427VU.
- 5 l ± 0.5 l (1.30 US Gal ± 0.13 US Gal) warning identified :
  - . On the ECAM displays
  - . By a red dot in the Yellow arc of the quantity indicator on panel 427VU.
  - . On CAPT and F/O main instrument panels 3VU and 5VU by a MASTER CAUTION light, and an aural warning.

    The 5 l level indication of the Yellow system reservoir controls closing of the Yellow system fire valve. Re-opening of this fire valve will automatically be controlled after topping up of Yellow reservoir. This is to maintain reservoir pressurization and to allow use of the ram air turbine in the event of compressor disk burst which might cause damage to the suction, delivery and case drain lines of the three systems in the nacelle area.

    (Ref. Fig. 001)

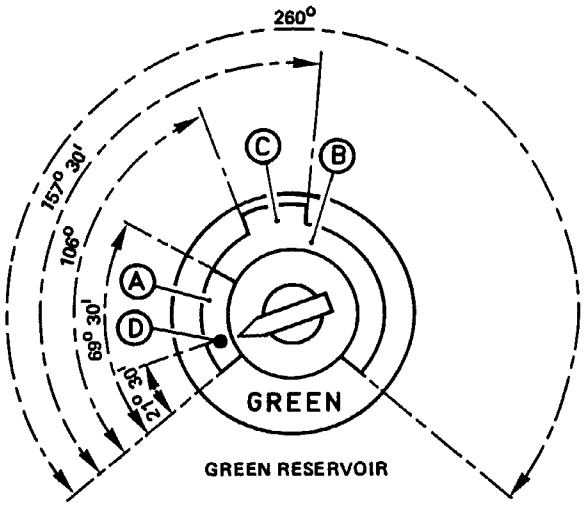
(Ref. Fig. 002)

(Ref. Fig. 003)



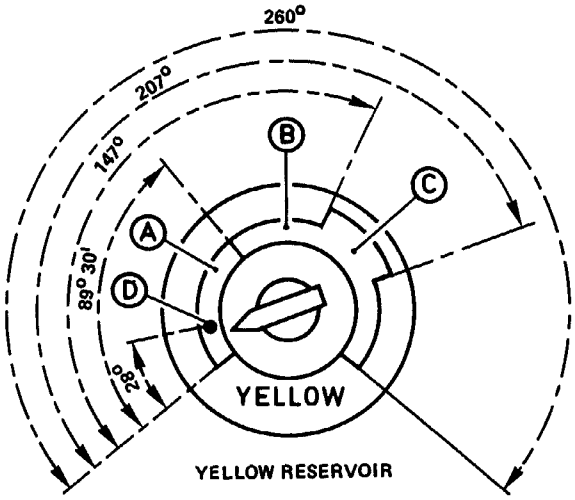
BLUE RESERVOIR

37° 30' WARNING LEVEL 5 L
72° MIN. NORMAL LEVEL 7L
108° TO 174° RANGE FOR NORMAL
RESERVOIR FILLING (9 L TO 13 L)



GREEN RESERVOIR

21° 30' WARNING LEVEL 5 L
69° 30' MIN. NORMAL LEVEL 10 L
106° TO 157° 30' RANGE FOR NORMAL
RESERVOIR FILLING (14 L TO 20 L)



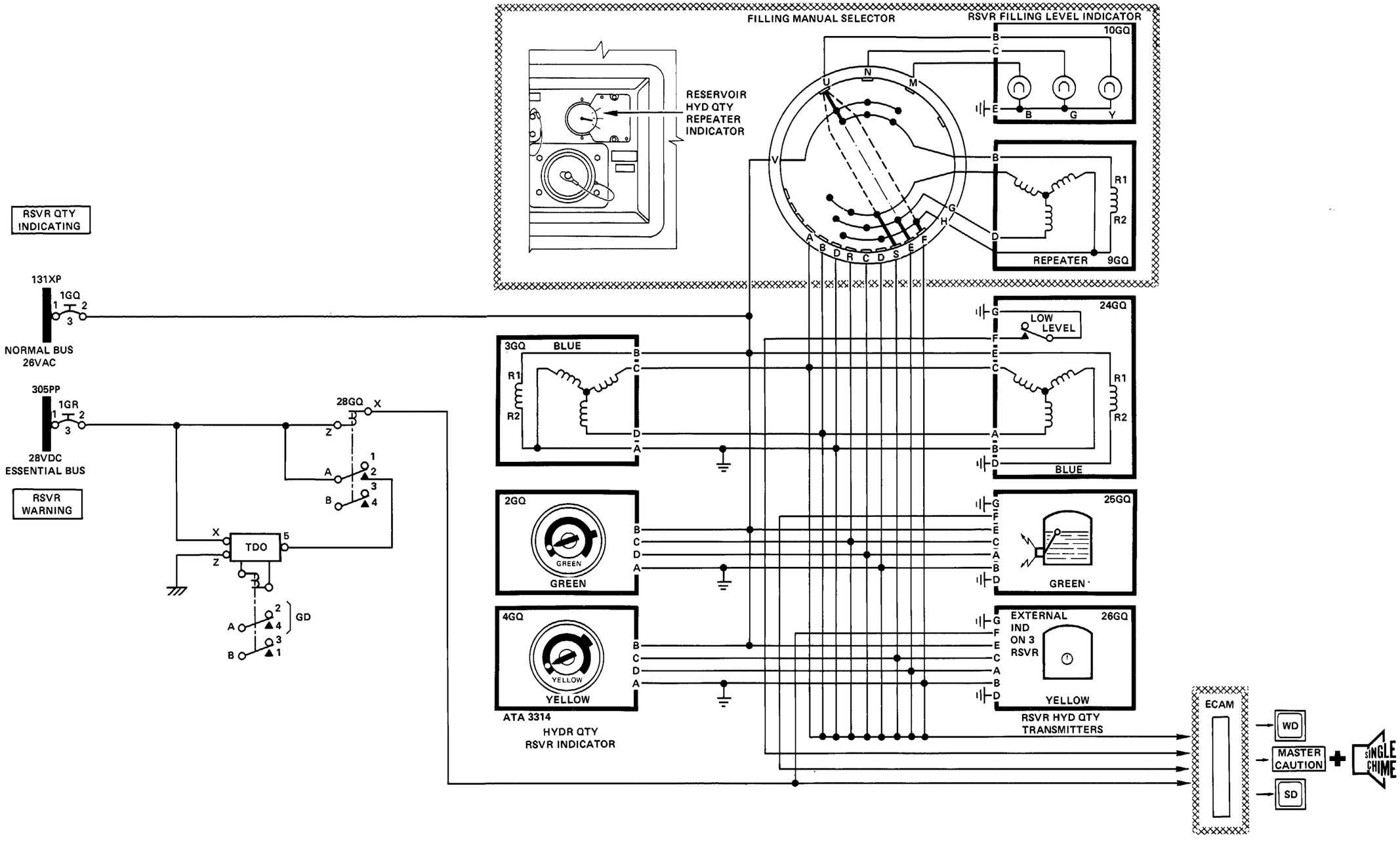
YELLOW RESERVOIR

28° WARNING LEVEL 5 L
89° 30' MIN. NORMAL LEVEL 10 L
147° TO 207° RANGE FOR NORMAL
RESERVOIR FILLING (15 L TO 19,8 L)

ARC A : YELLOW
ARCS B AND C : GREEN
DOT D : RED

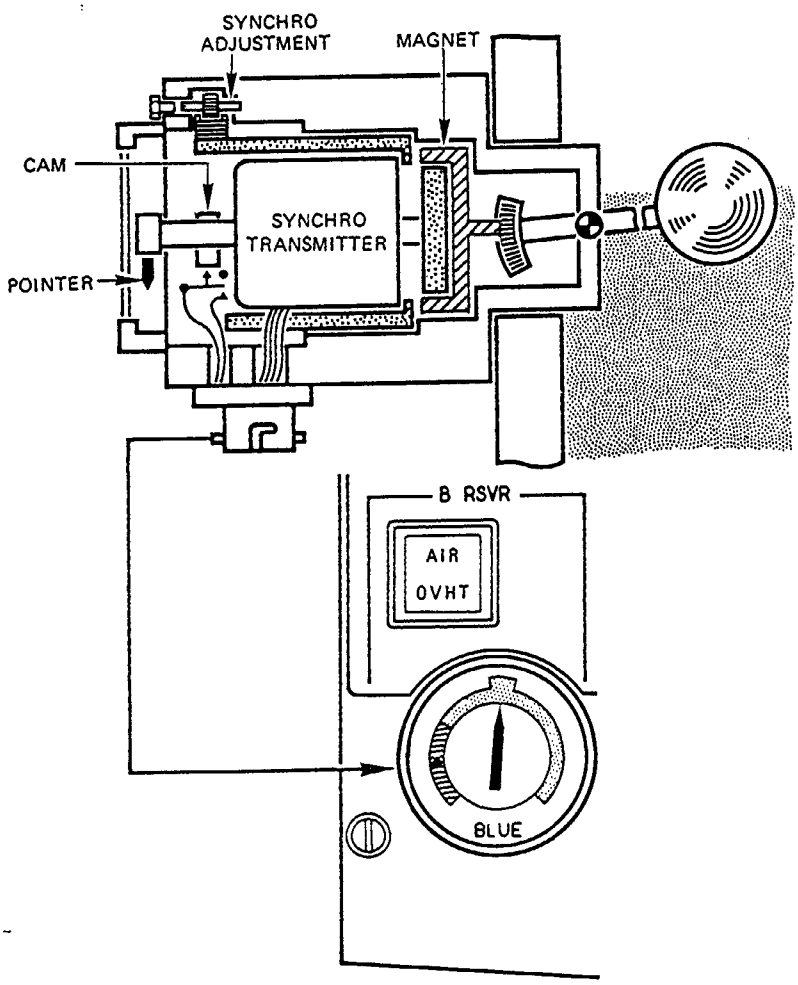
BM5 29 31 00 0 AFM0 – 01

Quantity Indicator Face Design
Figure 001



BM5 29 31 00 0 CAMO – 15

Hydraulic Fluid Level Indicating
Figure 002

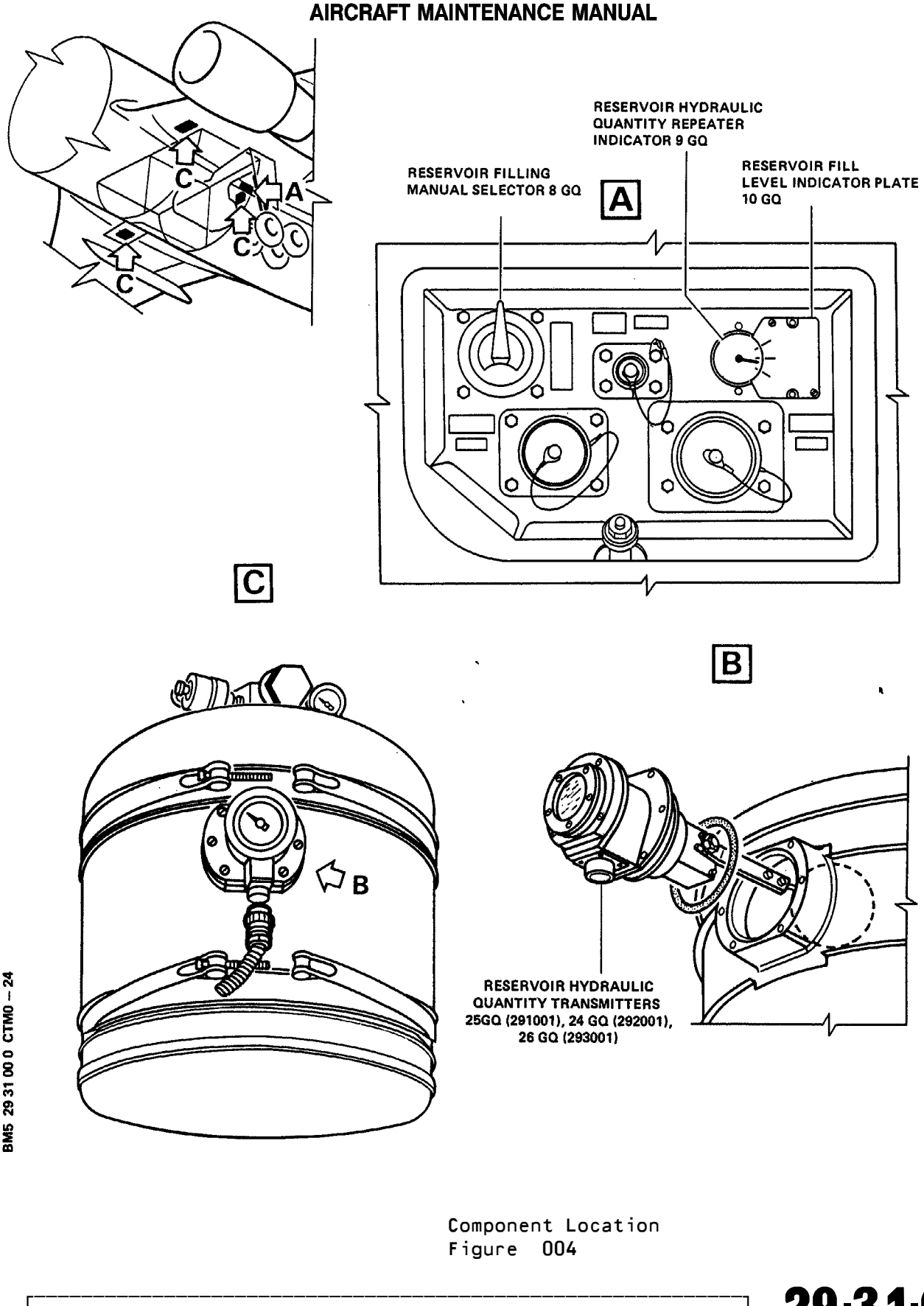


BM5 29 31 00 0 AAMO

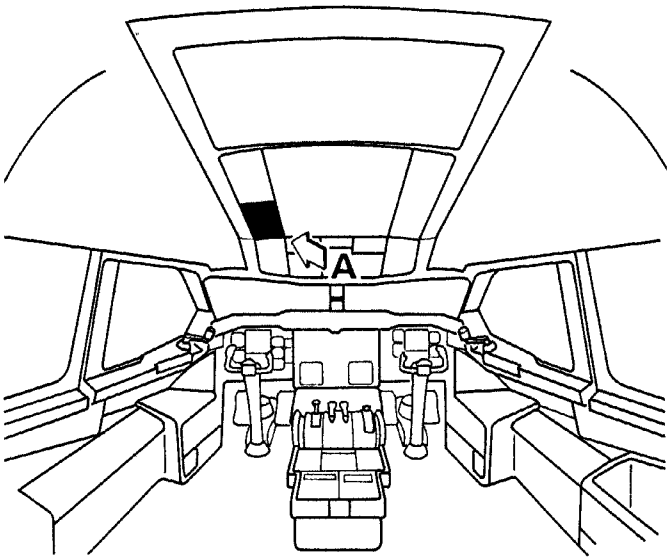
Hydraulic Quantity Indicating
Figure 003

2. Component Location
(Ref. Fig. 004)
(Ref. Fig. 005)

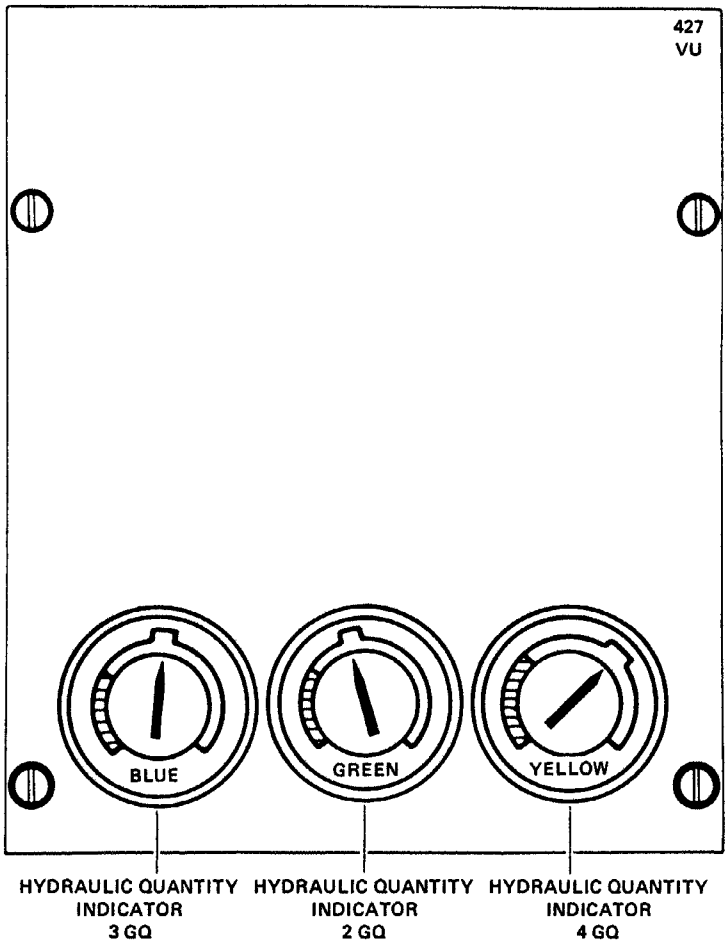
	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	2GQ	IND-GREEN RSVR HYD QTY	427VU	211	121BL	29-31-12
	3GQ	IND-BLUE RSVR HYD QTY	427VU	211	121BL	29-31-14
	4GQ	IND-YELLOW RSVR HYD QTY	427VU	211	121BL	29-31-16
	8GQ	MAN SELECTOR-RSVR FILLING		147	734 or 147BL	29-31-18
	9GQ	IND-RSVR HYD QTY REPEATER		147	734 or 147BL	29-31-19
	10GQ	IND PLATE-RSVR FILL LEVEL		147	734 or 147BL	29-31-17
R	24GQ	XMTR-BLUE RSVR HYD QTY		571	571BB	29-31-11
	25GQ	XMTR-GREEN RSVR HYD QTY		147	734	29-31-11
R	26GQ	XMTR-YELLOW RSVR HYD QTY		671	671BB	29-31-11



Component Location
Figure 004



A



BM5 29 31 00 0 CUMO – 15

Component Location
Figure 005

1. Operational Test

A. Reason for Job
To check the quantity indicators and legends

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 6 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

C. Procedure
(1)Job set-up
(a)Initial conditions
1 Correct electrical power supply.
2 Forward services ventilation system in operation.
3 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	CTL PNL LT	12WT	108/B 1
21VU	DISPLY L/H	7WT	108/B 2
21VU	DISPLY R/H	8WT	108/B 3
21VU	SGU 1	11WT1	108/B 4
21VU	SCU 2	11WT2	103/B 5
21VU	FWC NORM	6WW	108/B 6
21VU	FWC EMER	7WW	108/B 7
21VU	WLDP SUPP NORM	4WW	108/B 8
21VU	WLDP ESS	5WW	108/B 9
21VU	FLT WARN	24WW	108/B10
21VU	SDAC REF1	3WV1	109/A 1
21VU	SDAC REF2	3WV2	109/A 2
21VU	SDAC REF3	5WV	109/A 3
21VU	SDAC SYNC	7WV	109/A 4
21VU	SDAC SUPPLY	6WV	109/A 5
101VU	HYD PUMP	2GE	GEN2/B11
101VU	HYD PUMP	1GE	GEN1/B8
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RAT/TEST	1GF	331/V59
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	SRVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/AUTO	153LP	323/M83

4 Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301)
5 Check that hydraulic fluid quantity in reservoirs is correct (Ref. 12-12-29, P. Block 1)
6 Check that reservoir pressure gages read 3.5 bars (50 psi). Pressurize if required.

(b) In flight compartment, on HYD PWR panel 427VU, make certain that the aircraft is in the following configuration.
1 HYD PWR, PUMPS ENG1 - PUMPS ENG2 pushbutton switches released (out), OFF legends on.
2 ELEC PUMPS pushbutton switch released (out), ON and LO PR legends off.
3 PTU pushbutton switch released (out), ON legend off.
4 On panel 427VU, B, G, Y RSVR, AIR, OVHT warning lights are off.
5 To check Green system hydraulic reservoir level, open L or R main gear door (Ref. 32-12-11, P. Block 301).
6 Install access platform at zone 571 (671).

(2) Tests

ACTION	RESULT
1. On ECAM control panel press (in) HYD pushbutton switch	On right ECAM display unit HYD page appears. Check that configuration enumerated above is correct.
2. On panel 427VU, on each hydraulic fluid quantity indicator, record pointer position	On corresponding hydraulic reservoir level indicator, pointer position must be identical to indication in flight compartment.

(3) Close-up
(a) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access

equipment and miscellaneous items.
(c)Close main gear door (Ref. 32-12-11, P. BLock 301).

2. Functional Test

A. Reason for the job
(1)To check hydraulic quantity indications and associated warnings

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8ft. 6in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

C. Procedure
(1)Job set-up
(a)Initial conditions
1 Correct electrical power supply.
2 Forward services ventilation system in operation.
3 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	CTL PNL LT	12WT	108/B 1
21VU	DISPLY L/H	7WT	108/B 2
21VU	DISPLY R/H	8WT	108/B 3
21VU	SGU1	11WT1	108/B 4
21VU	SGU2	11WT2	108/B 5
21VU	FWC NORM	6WW	108/B 6
21VU	FWC EMER	7WW	108/B 7
21VU	WLDP SUPP NORM	4WW	109/B 8
21VU	WLDP ESS	5WW	108/B 9
21VU	FLT WARN	24WW	108/B10
21VU	SDAC REF1	3WV1	109/A 1
21VU	SDAC REF2	3WV2	109/A 2
21VU	SDAC REF3	5WV	109/A 3
21VU	SDAC SYNC	7WV	109/A 4
21VU	SDAC SUPPLY	6WV	109/A 5
101VU	HYD PUMP	2GE	GEN2/B11
101VU	HYD PUMP	1GE	GEN1/B8
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RAT/TEST	1GF	331/V59
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60

PANEL	SERVICE	IDENT.	LOCATION
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	SRVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/AUTO	153LP	323/M83

4 Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
5 Check that hydraulic fluid quantity in reservoir is correct (Ref. 12-12-29, P. Block 1).
6 Check that reservoir pressure gages read 3.5 bars (50 psi). Pressurize if required.

(b)In flight compartment, on HYD PWR panel 427VU, make certain that the aircraft is in the following configuration.
1 HYD PWR, PUMPS ENG1 - PUMPS ENG2 pushbutton switches released (out), OFF legends on.
2 ELEC PUMPS pushbutton switch released (out), ON and LO PR legends off.
3 PTU pushbutton switches released (out), ON legends off.
4 On panel 427VU, annunciator AIR and OVHT legends off.
5 To check Green system hydraulic reservoir level open L or R main gear door (Ref. 32-12-11, P. Block 301).
6 Install access platform at zone 571 (671).

(2)Tests

ACTION	RESULT
1. Depressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301)	In flight compartment, on panel 427VU annunciator AIR legend comes on.
2. In hydraulics compartment, install draining equipment, slowly loosen reservoir drain valve until reservoir gage reads - 10 l (2.64 US Gal) for Green and Yellow system reservoirs - 7 l (1.85 US Gal) for Blue system reservoir	In flight compartment, HYD PWR panel 427VU, check that quantity indicator pointer is at limit of green segment
3. Continue draining reservoir until warnings appear	In flight compartment, on panel 427VU annunciator AIR legend is on - On CAPT and F/O main instrument panels 3VU and 5VU, MASTER CAUTION lights come on.

ACTION	RESULT
	- Single chime sounds. On left ECAM display unit GREEN and BLUE and YELLOW RSVR LO LEVEL warning messages appear.
4. In flight compartment, on maintenance panel 472VU, place ANN LT switch in READ position.	On panel 471VU: - SHUT legend of the FIRE VALVES Y annunciator comes on. - OPEN legends of the FIRE VALVES annunciators of the other two hydraulic systems come on.
5. On ECAM control panel press(in) HYD pushbutton switch	On right ECAM display unit, "Reservoir level indication", check that amber indicator comes on (5 L left) (1.32 US Gal). In hydraulics compartment, check that reservoir gage indicates 5 ± 0.5 l (1.32 ± 0.13 US Gal)
6. Continue draining reservoir until reservoir gage reads 3.78 l (1 US Gal) NOTE : Check drained quantity which must be 5 ± 0.5 l (1.32 ± 0.13 US Gal)	On panel 427VU, check that quantity indicator pointer is at beginning of amber segment. On right ECAM display unit, indicators read 3.78 l (1 US Gal) which corresponds to the position of the quantity indicator pointer between low level and zero. On refilling selector (door 147AL) direct reading indicator pointer reads 3.78 l (1 US Gal) which corresponds to the position of the indicator pointer between low level and zero.
7. Close reservoir drain valve, remove equipment, install the 2 plugs with new O-rings, wirelock plugs	
8. Connect hydraulic reservoir replenishing unit (Ref. 12-12-29, P. Block 1) Slowly top-up reservoir fluid level up to approx. 5 L (1.32 US gal.)	- On CAPT and F/O main instrument panels 3VU and 5VU, MASTER CAUTION lights go off. - Fluid quantity gages indicate 5 ± 0.5 l (1.32 ± 0.13 US Gal) - On right ECAM display unit, indicator comes on (5 L left) (1.32 US Gal). - Check corresponding accuracy between flight compartment and hydrau-

ACTION	RESULT
	lic reservoir gages. - On panel 471VU, on the FIRE VALVE annunciator of the system in test, SHUT legend goes off, then OPEN legend comes on.
9. In flight compartment, on maintenance panel 472VU, place ANN LT switch in OFF position.	- On panel 471VU, all legends of FIRE VALVE annunciator are OFF.
10. For Blue system reservoir stop replenishing when gages read 12 L (3.17 US Gal)	- Check corresponding accuracy between flight compartment and hydraulic reservoir gages.
11. For Green system reservoir continue repleshing to 17 l (4.49 US Gal)	
12. For Yellow system reservoir continue replenishing to 18.5 l (4.89 US Gal)	
13. Connect hydraulic reservoir pressurization system, slowly increase reservoir pressure until annunciator AIR legend goes off.	On panel 427VU, annunciator AIR legend must go off for a maximum pressure of 1.7 bar. (24.65 psi)
NOTE : Reservoir pressure gage reading tolerance of ± 0.15 bar (± 2.17 psi) must be taken into account.	
14. Slowly depressurize system until annunciator AIR legend comes on	- Check that annunciator AIR legend comes on for a pressure of 1.5 ± 0.1 bar (21.75 ± 1.45 psi) - On CAPT and F/O main instrument panels 3VU and 5VU, MASTER CAUTION lights come on. Single chime sounds.
15. Perform again pressurization procedure to normal pressure 3.5 ± 0.25 bar (50.76 ± 3.63 psi)	

(3) Close-up
- (a) De-energize the aircraft electrical network. (Ref. 24-41-00, P. Block 301).
- (b) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (c) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.
- (d) Remove access platform
- (e) Close main gear door (Ref. 32-12-11, P. Block 301).

HYDRAULIC QUANTITY INDICATING - DEACTIVATION/REACTIVATION

Ref. MEL Sect 1-29 Item 9 (RSVR Quantity Gages)

CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING ON RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Deactivation

A. Reason for the Job

(1)Visual check when electrical indicators are not operating.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.6 m (8 ft. 6 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	A/C External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

C. Procedure

(Ref. Fig. 901)

(1)Job Set-Up

(a)Open main landing gear doors (Ref. 32-12-11, P. Block 301).

(b)Position access platform.

(c)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).

(d)Display warning notices prohibiting start-up :

- of Green system electric pumps and power transfer units on panel 427VU
- of Yellow system electric pump on panel 9VU
- of hand pump in hydraulics compartment.

(2)Check

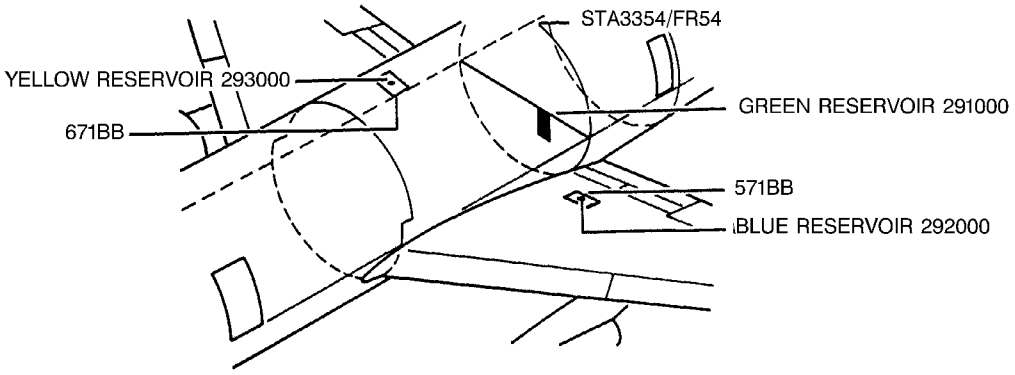
(a)On fluid quantity transmitter direct reading gage, check reservoir contents and top up if required (Ref. 12-12-29, P. Block 1).

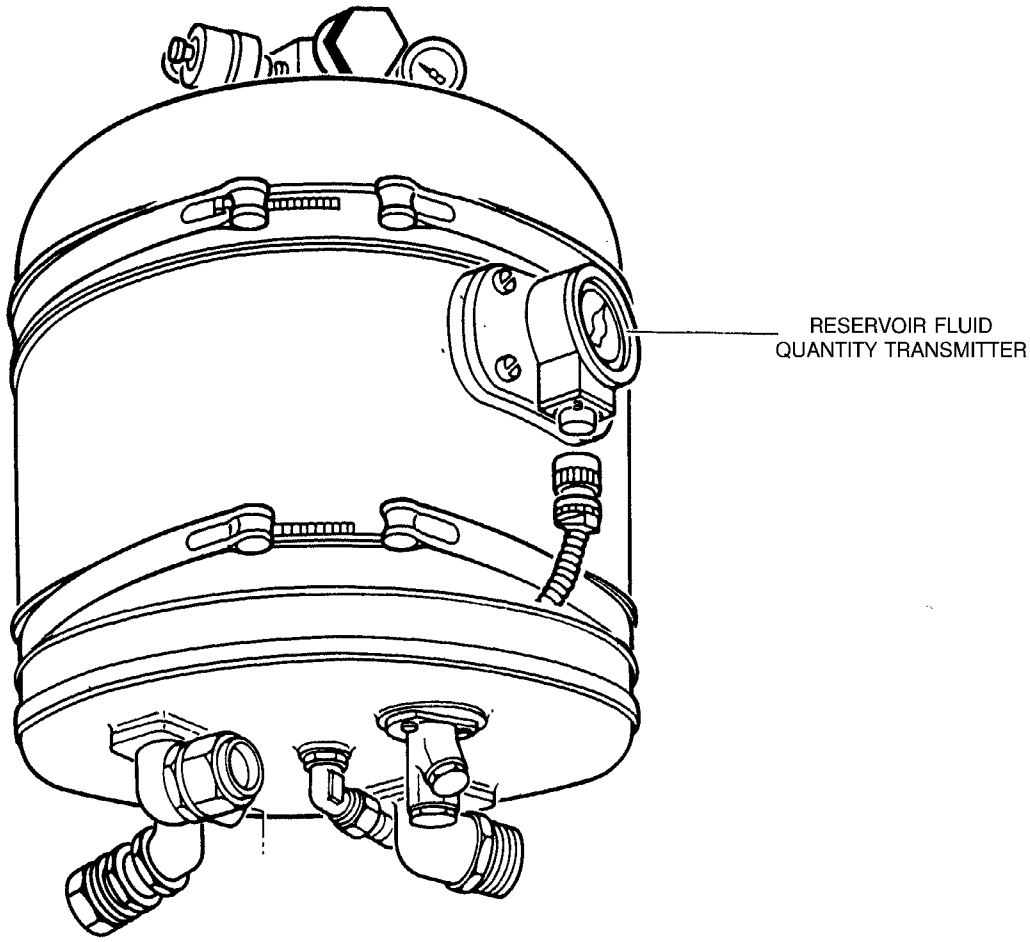
(3)Close-up

(a)Remove warning notices.

(b) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

(c)In flight compartment, on panel install a temporary placard to warn the flight crew that Green (Blue, Yellow) hydraulic reservoir quantity indicator 2GQ (3GQ, 4GQ) is inoperative.





BM5 29 31 00 9 BAM0 01

R

Hydraulic Reservoir
Figure 901

(d)Make an entry in the aircraft technical log.
(e)Close main gear main doors (Ref. 32-12-11, P. Block 301).

2. Reactivation

A. Refer to TSM 29-31

B. Remove Temporary Placard in Flight Compartment.

GREEN RESERVOIR HYDRAULIC QUANTITY TRANSMITTER - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT LANDING GEAR SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION BEFORE APPLYING OR RELEIVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

CAUTION : WHEN EVER CARGO COMPARTMENT DOORS REMAIN OPEN DURING MAINTENANCE ON YELLOW HYDRAULIC SYSTEM (DISCONNECTION OF HYDRAULIC LINES OR REPLACEMENT OF HYDRAULIC COMPONENTS), MAKE CERTAIN THAT CARGO COMPARTMENT DOOR ACTUATOR IS FILLED WITH HYDRAULIC FLUID. IF NOT, BLEED ACTUATOR AND PRESSURIZE LINES PRIOR TO CLOSING (REF. 52-33-00, P. BLOCK 301).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 6 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-00-00, P. Block 401	Hydraulic Power - General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-31-00, P. Block 501	Hydraulic Quantity Indicating
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-33-00, P. Block 301	Cargo Compartment Doors Hydraulic System

2. Procedure

NOTE : Removal/installation procedure of Blue hydraulic reservoir 292001 and Yellow hydraulic reservoir 293001 quantity indicating transmitters is dealt with in this chapter.

A. Job Set-Up

(1) In flight compartment, on HYD PWR panel 427VU, make certain that hydraulic power is in the following configuration :

(a) ELEC PUMPS pushbutton switch released (out).

(b) Yellow system PTU pushbutton switch released (out). (for Yellow system reservoir transmitter)

(c) Blue system PTU pushbutton switch released (out) (for Blue system reservoir transmitter)

(d) PUMPS ENG 1 pushbutton switch released (out) (for Green and Blue system reservoir transmitters)

(e) PUMPS ENG 2 pushbutton switch released (out) (for Green and Yellow system reservoir transmitters)

(2) Display warning notice prohibiting use of hydraulic system ground connectors

(3) Open, safety and tag the following circuit breakers :

(a)For Green system quantity indicator transmitter.

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58

(b)For Blue system quantity indicating transmitter.

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/B	1GL	332/U59
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58

(c)For Yellow system quantity indicating transmitter

PANEL	SERVICE	IDENT.	LOCATION
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(d)In case of Yellow system transmitter removal/installation procedure, open cargo compartment doors and leave them open if they are to be used while aircraft is on ground. (Ref. 52-30-00, P. Block 1).
(e)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(f)Depressurize hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(g)Install access platform at zone 571 for Blue system transmitter (671 for Yellow system transmitter).
(h)Depressurize Green, Blue or Yellow hydraulic system (Ref. 29-10-00, P. Block 301).
(j)During Yellow system transmitter removal, display a warning notice prohibiting operation of hand pump and of Yellow system electric pump.
(k)Drain appropriate reservoir (Ref. 29-00-00, P. Block 301).

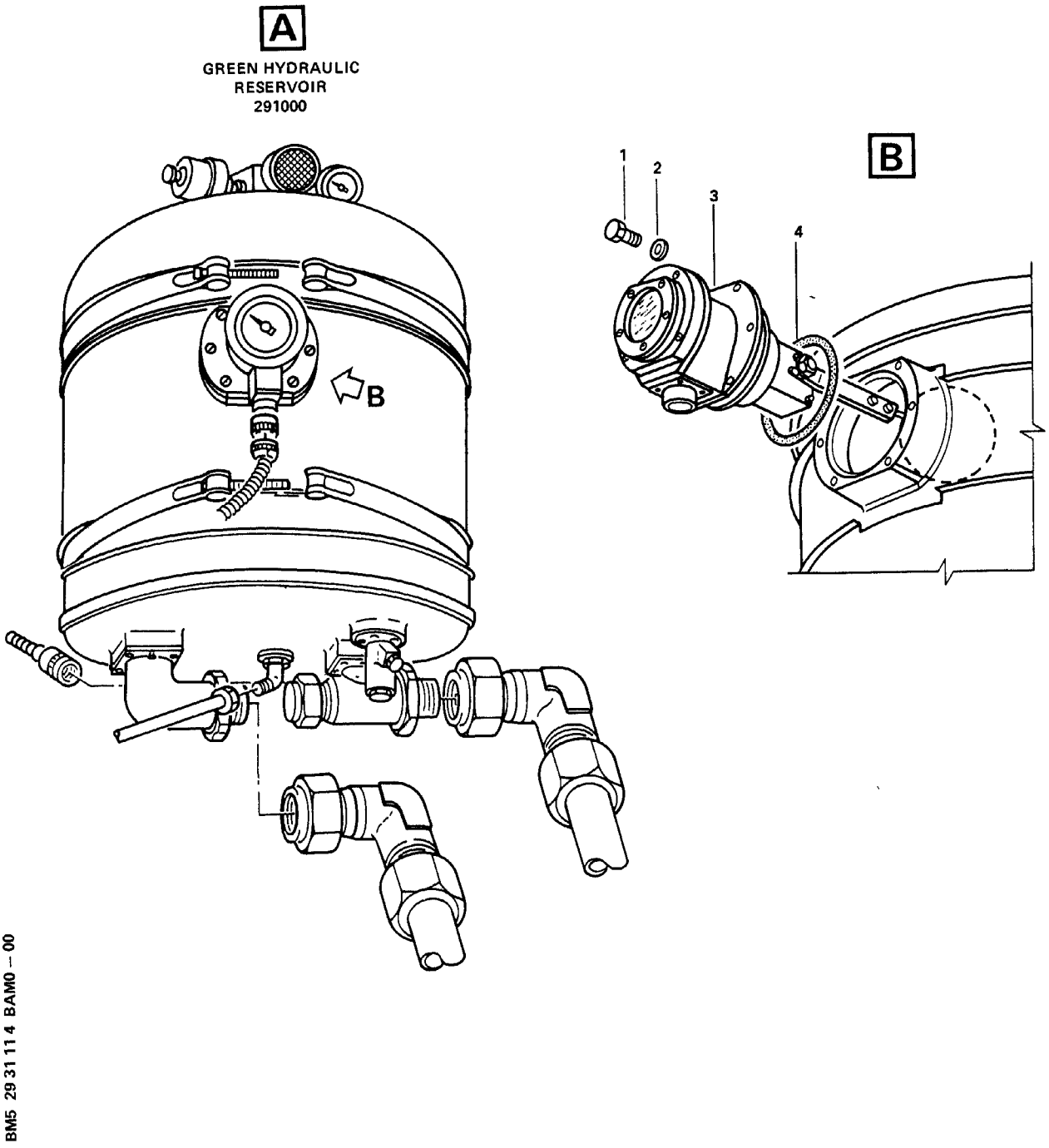
B. Removal (Ref. Fig. , 401)
(1)Remove electrical connector (5) from transmitter to be removed.
(2)Cut and remove lockwire from screws (1).
(3)Remove the 6 screws (1).
(4)Retain the 6 washers (2).
(5)Remove transmitter (3) taking care not to damage float.
(6)Remove and discard seal (4).

C. Preparation of Replacement Component
Make certain that transmitter part number corresponds to reservoir in which it is to be installed.

D. Installation
(1)Install transmitter (3) equipped with new seal (4) in reservoir body.
(2)Install the 6 attachment screws (1) with washers (2).
(3)Tighten home and TORQUE TO 0.5 m.daN (44.4 lbf.in.).
(4)Safety screws (1) with lockwire.
(5)Connect electrical connectors (5) to transmitter (3).

E. Tests
(1)Replenish hydraulic reservoir (Ref. 12-12-29, P. Block 1) and perform hydraulic fluid level indicating test (Ref. 29-31-00, P. Block 501).
(2)Check for leakage.
(3)Check reservoir hydraulic fluid level, top up if required (Ref. 12-12-29, P. Block 1).
(4)Check that reservoir pressurization is normal (Ref. 29-14-00, P. Block 301).

F. Close-Up
(1)Close cargo compartment doors (Ref. 52-30-00, P. Block 1).
(2)Remove warning notices.
(3)Remove access platforms.
(4)Close main gear main doors (Ref. 32-12-11, P. Block 301).



Hydraulic Reservoir Transmitter
Figure 401

GREEN RESERVOIR HYDRAULIC QUANTITY INDICATOR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Cap
B.	Circuit Breaker Safety Clip
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-31-00, P. Block 501	Hydraulic Quantity Indicating

2. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that the ventilation of the electronics racks is correct.
(3)Open, safety and tag the following circuit breaker :

	PANEL	SERVICE	IDENT.	LOCATION
R	133VU	RSVR/QTY/IND	1GQ	333/T59

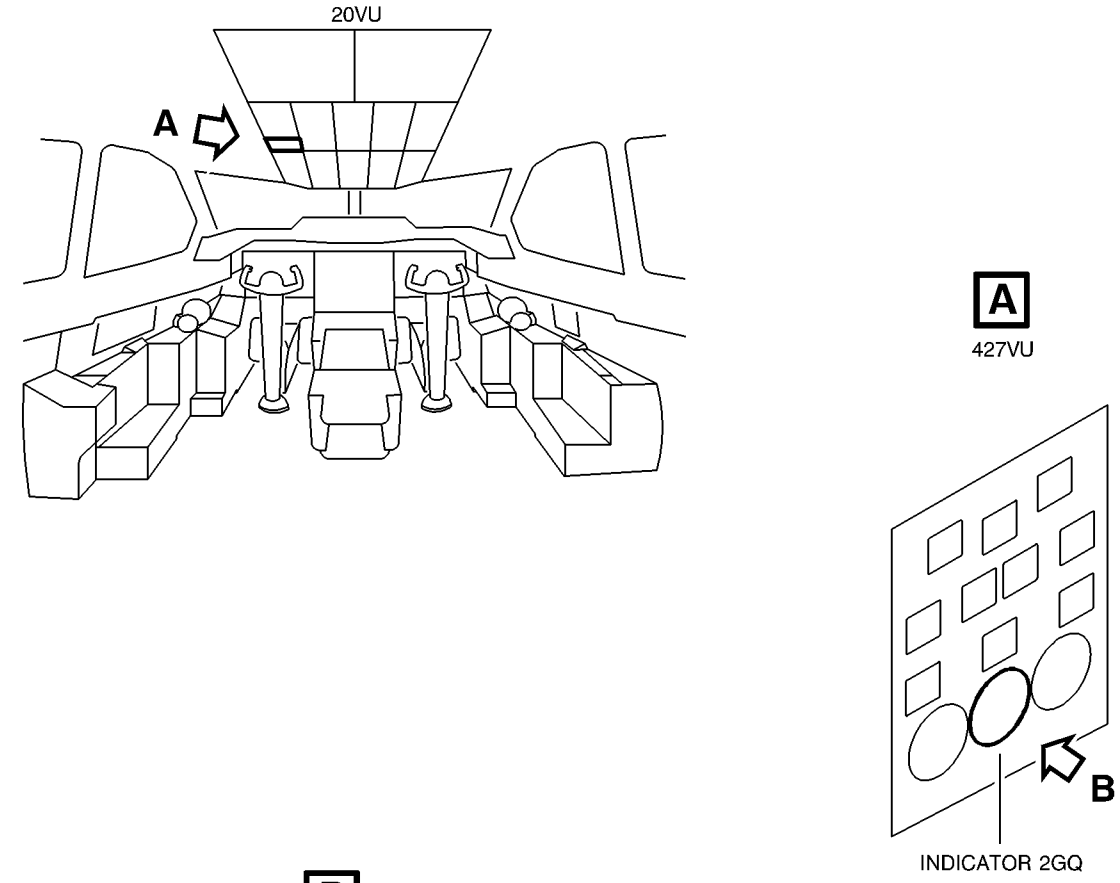
B. Removal (Ref. Fig. 401)
(1)Loosen the screw (3).
(2)Pull the indicator (4) out of panel (2).
(3)Disconnect the electrical connector (1) from the indicator (4).
(4)Install a blanking cap on the disconnected electrical connector.

C. Preparation of the Replacement Component
(1)Clean the component interface and/or the adjacent area.
(2)Inspect the component interface and/or the adjacent area.

D. Installation (***//AAM0//***)
(1)Remove the blanking cap from the electrical connector (1).
(2)Make certain that the electrical connector is clean and in correct condition.
(3)Connect the electrical connector (1) to the indicator (4).
(4)Install and align the indicator (4) in the panel (2).
(5)Tighten the screw (3).

E. Test
(1)Remove the safety clip and tag and close the circuit breaker 1GQ.
(2)Do an operational test of the hydraulic quantity indicator (Ref. 29-31-00, P. Block 501).

F. Close-up
(1)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Green Reservoir Hydraulic Quantity Indicator
Figure 401

BLUE RESERVOIR HYDRAULIC QUANTITY TRANSMITTER - REMOVAL/INSTALLATION

Removal/ Installation of blue reservoir hydraulic quantity transmitter 2001 is dealt with in 29-31-11, P. Block 401.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Cap
B.	Circuit Breaker Safety Clip
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-31-00, P. Block 501	Hydraulic Quantity Indicating

2. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that the ventilation of the electronics racks is correct.
(3)Open, safety and tag the following circuit breaker :

	PANEL	SERVICE	IDENT.	LOCATION
R	133VU	RSVR/QTY/IND	1GQ	333/T59

B. Removal (Ref. Fig. 401)
(1)Loosen the screw (3).
(2)Pull the indicator (4) out of panel (2).
(3)Disconnect the electrical connector (1) from the indicator (4).
(4)Install a blanking cap on the disconnected electrical connector.

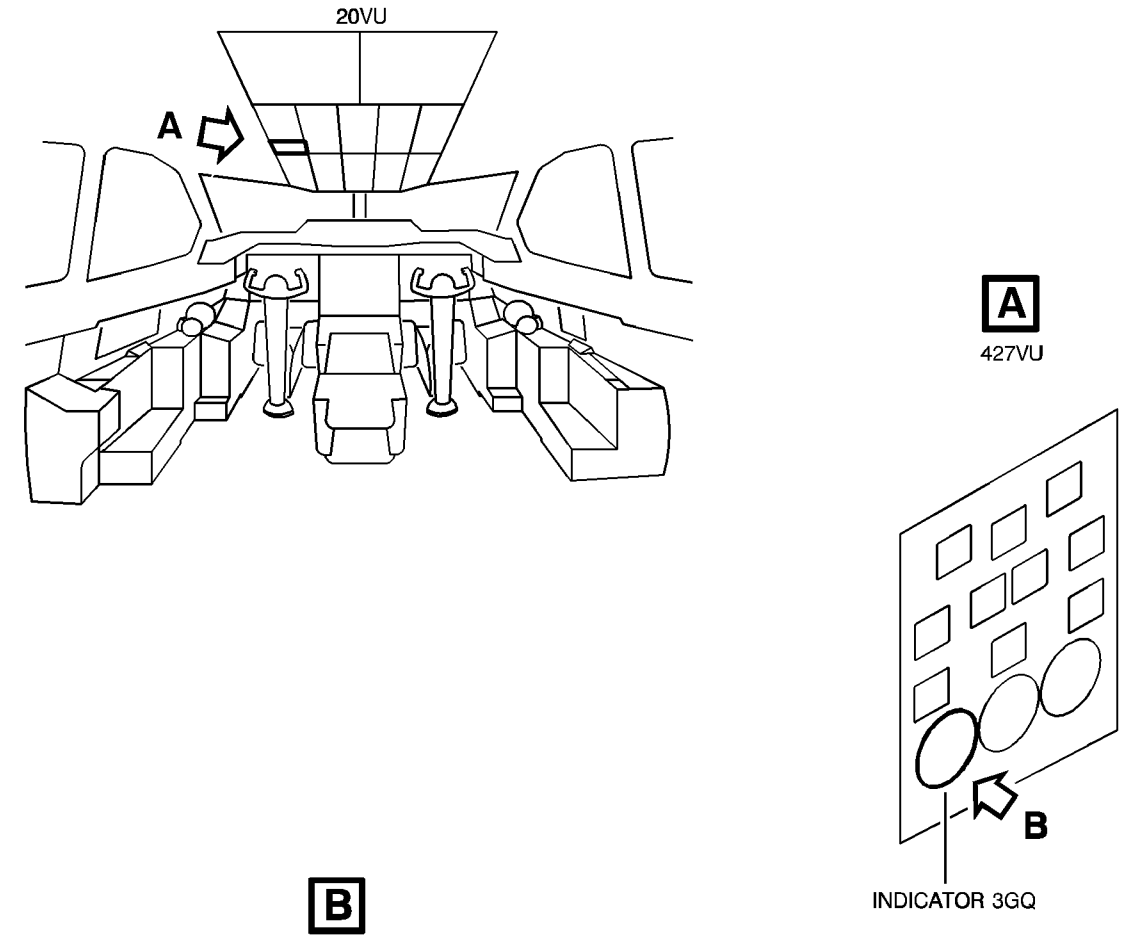
C. Preparation of the Replacement Component
(1)Clean the component interface and/or the adjacent area.
(2)Inspect the component interface and/or the adjacent area.

D. Installation (Ref. Fig. 401)
(1)Remove the blanking cap from the electrical connector (1).
(2)Make certain that the electrical connector is clean and in correct condition.
(3)Connect the electrical connector (1) to the indicator (4).
(4)Install and align the indicator (4) in the panel (2).
(5)Tighten the screw (3).

E. Test
(1)Remove the safety clip and tag and close the circuit breaker 1GQ.
(2)Do an operational test of the hydraulic quantity indicator (Ref. 29-31-00, P. Block 501).

F. Close-up
(1)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(2)De-energize the aircraft electrical network
(Ref. 24-41-00, P. Block 301).



Blue Reservoir Hydraulic Quantity Indicator
Figure 401

R

YELLOW RESERVOIR HYDRAULIC QUANTITY TRANSMITTER - REMOVAL/INSTALLATION

Removal/Installation of yellow reservoir hydraulic quantity transmitter 3001 is dealt with 29-31-11, P. Block 401.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Cap
B.	Circuit Breaker Safety Clip
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-31-00, P. Block 501	Hydraulic Quantity Indicating

2. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that the ventilation of the electronics racks is correct.
(3)Open, safety and tag the following circuit breaker :

	PANEL	SERVICE	IDENT.	LOCATION
R	133VU	RSVR/QTY/IND	1GQ	333/T59

B. Removal (Ref. Fig. 401)
(1)Loosen the screw (3).
(2)Pull the indicator (4) out of panel (2).
(3)Disconnect the electrical connector (1) from the indicator (4).
(4)Install a blanking cap on the disconnected electrical connector.

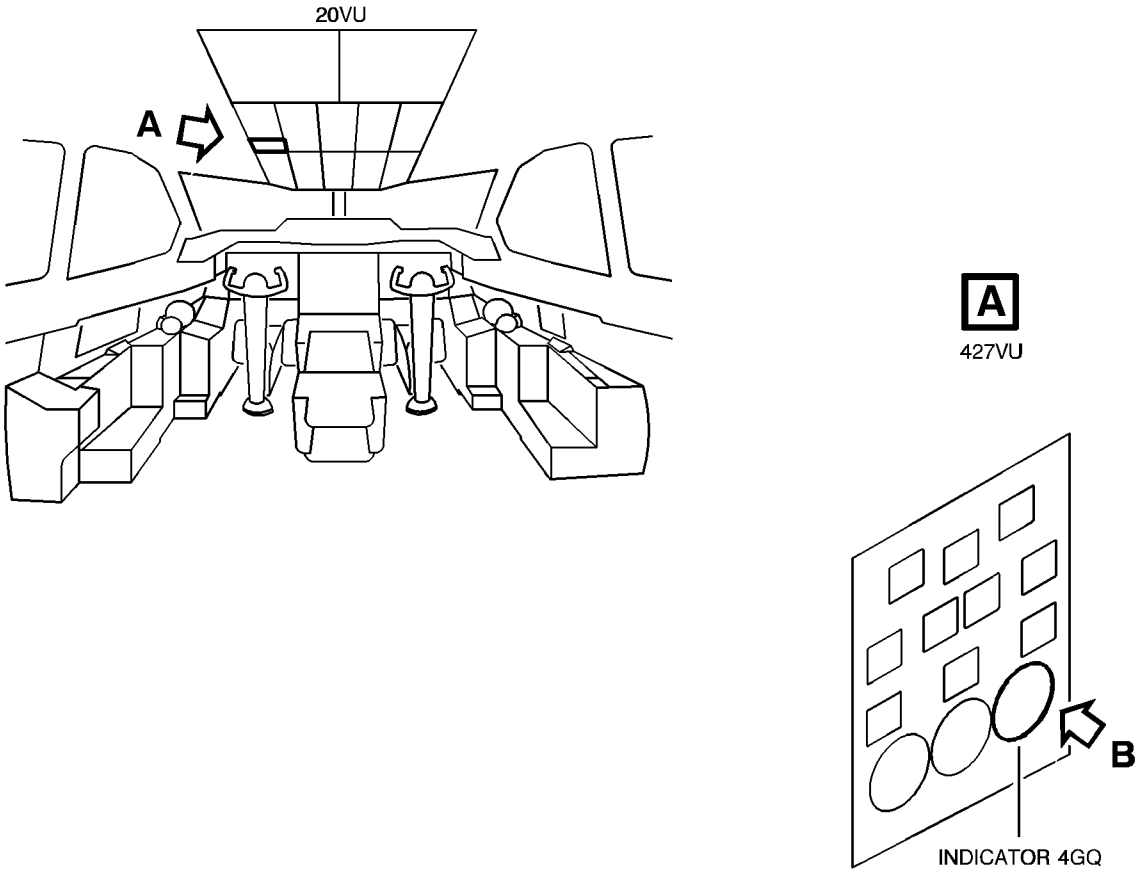
C. Preparation of the Replacement Component
(1)Clean the component interface and/or the adjacent area.
(2)Inspect the component interface and/or the adjacent area.

D. Installation (***//AAM0//***)
(1)Remove the blanking cap from the electrical connector (1).
(2)Make certain that the electrical connector is clean and in correct condition.
(3)Connect the electrical connector (1) to the indicator (4).
(4)Install and align the indicator (4) in the panel (2).
(5)Tighten the screw (3).

E. Test
(1)Remove the safety clip and tag and close the circuit breaker 1GQ.
(2)Do an operational test of the hydraulic quantity indicator (Ref. 29-31-00, P. Block 501).

F. Close-up
(1)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(2)De-energize the aircraft electrical network
(Ref. 24-41-00, P. Block 301).



Yellow Reservoir Hydraulic Quantity Indicator
Figure 401

R

RESERVOIR FILLING MANUAL SELECTOR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 7 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-00-00, P. Block 301	Hydraulic Power - General
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up
(1)Open left main gear door (Ref. 32-12-11, P. Block 301).
(2)Open Green system ground connector access door.
(3)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/QTY/IND	1GQ	333/T59

B. Removal (Ref. Fig. 401)
NOTE : Install blanking caps/plugs on all removed hydraulic lines. Discard all removed seals.
(1)Disconnect electrical connector (1).
(2)Loosen unions (2) and disconnect hydraulic lines.
(3)Remove lockwire from screws (4).
(4)Remove screws (4) and retain washers (5).
(5)Remove manual selector (6).

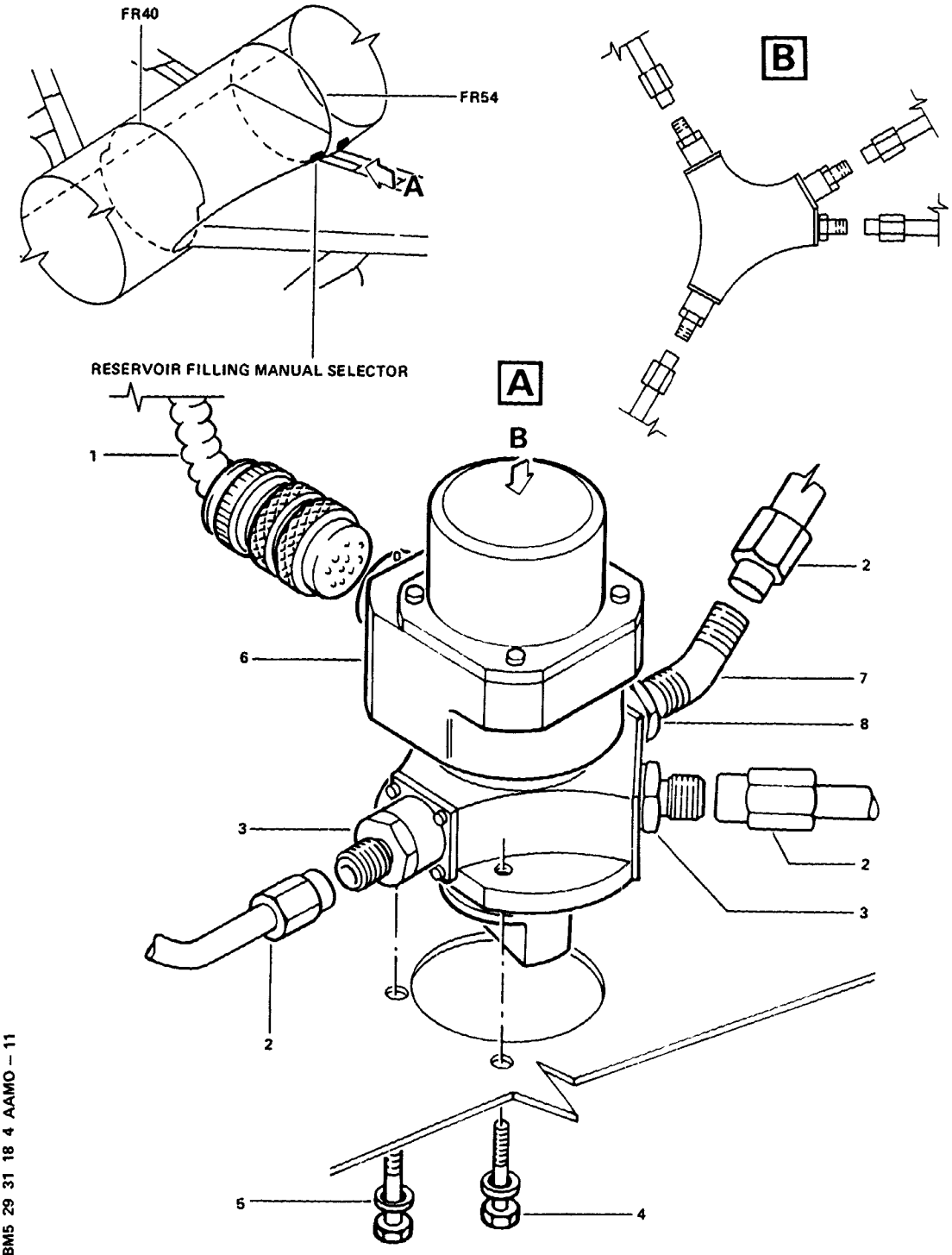
C. Preparation of Replacement Component
(1)Remove unions (3) from removed component. Install these unions, equipped with new O-ring, in their respective locations on new component.
(2)Remove elbow (7) and nut (8) from removed component. Install elbow and nut, equipped with new O-ring and new backup-ring on new component.

D. Installation
(1)Install manual selector (6).
NOTE : Attachment holes are not equidistant so as to avoid incorrect installation.
(2)Install washers (5) and screws (4). Tighten and safety with lockwire.
(3)Remove blanking caps/plugs, connect hydraulic lines and tighten unions (2).
(4)Connect electrical connector (1).

E. Test
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(2)Remove safety clip and tag and close circuit breaker 1GQ.
(3)Partially drain Green, Blue and Yellow hydraulic reservoir systems (Ref. 29-00-00, P. Block 301).
(4)Top up reservoirs (Ref. 12-12-29, P. Block 1).
(5)While topping up, check selector for correct operation and leakage.
(6)Check that selector has been returned to NEUTRAL position.

F. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Wipe off all traces of hydraulic fluid.
(3)Close access door.
(4)Remove all ground handling and maintenance equipment, standard and special tools together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(5)Close main gear door (Ref. 32-12-11, P. Block 301).



Reservoir Filling Manual Selector
Figure 401

RESERVOIR HYDRAULIC QUANTITY REPEATER INDICATOR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 7 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up
(1)Open left main gear door (Ref. 32-12-11, P. Block 301).
(2)Open Green system ground connector access door 147AL.
(3)Open, safety and tag the following circuit breaker :

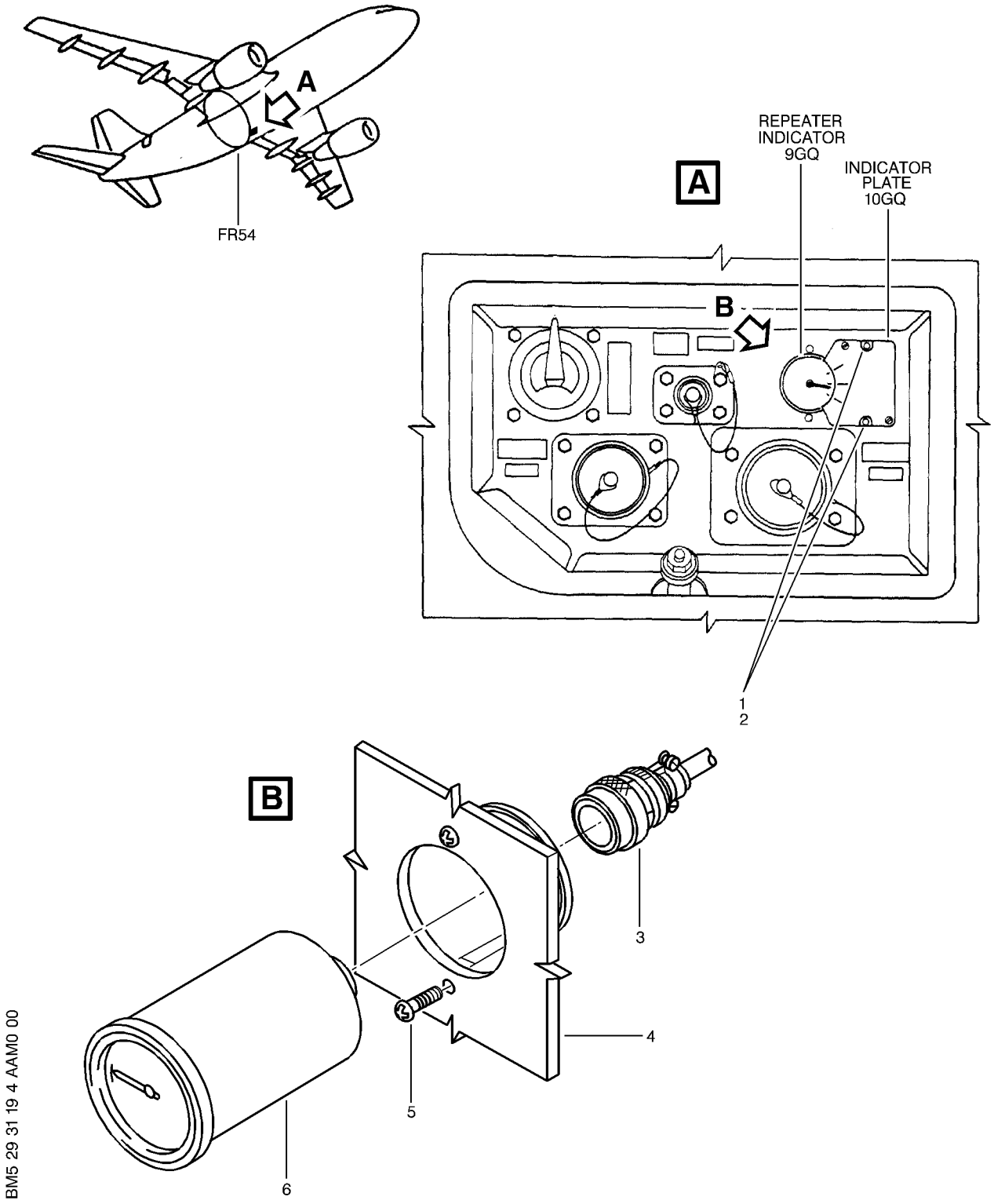
PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/QTY/IND	1GQ	333/T59

B. Removal
(Ref. Fig. 401)
(1)Remove screws (1) and washers (2).
(2)Carefully pull on the indicator plate, to get access to repeater indicator.
(3)Loosen the screws (5).
(4)Pull the repeater indicator (6) out of the ground service panel (4).
(5)Disconnect the electrical connector (3) from the repeater indicator (6).
(6)Install blanking caps on the disconnected electrical connectors.

C. Preparation of the Replacement Component
(1)Clean the component interface and/or the adjacent area.
(2)Inspect the component interface and/or the adjacent area.

D. Installation (Ref. Fig. 401)
(1)Remove the blanking caps from the electrical connector (3) and the repeater indicator (6).
(2)Make certain that the electrical connectors are clean and in correct condition.
(3)Connect the electrical connector (3) to the repeater indicator (6).
(4)Install and align the repeater indicator (6) in the ground service panel (4).
(5)Tighten the screws (5).
(6)Install the indicator plate in its housing.
(7)Install screws (1) and washers (2).
(8)Tighten the screws (1).

E. Test



Reservoir Hydraulic Quantity Repeater Indicator
Figure 401

(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.
(2)Remove safety clip and tag and close circuit breaker 1GQ.
(3)Perform a fluid level check (Ref. 12-12-29, P. Block 1).
During this check, make certain that repeater indicator 9GQ indicates a realistic value corresponding to the :
- quantity indicator of the Green hydraulic system reservoir,
- quantity indicator of the Blue hydraulic system reservoir,
- quantity indicator of the Yellow hydraulic system reservoir.

F. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Close Green system ground connector access door 147AL.
(3)Remove all ground handling and maintenance equipment, standard and special tools together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(4)Close main gear door (Ref. 32-12-11, P. Block 301).

HYDRAULIC PRESSURE INDICATING - DESCRIPTION AND OPERATION

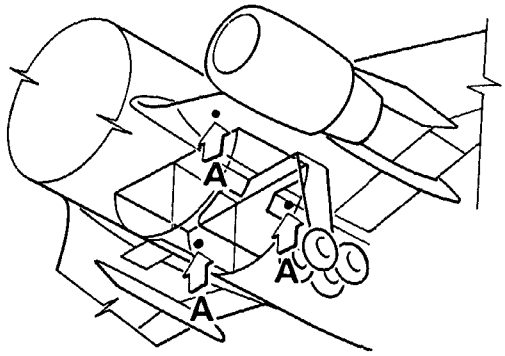
1. Pressure Indicating
   In each hydraulic system :

   A digital pressure indication is transmitted to the ECAM display by a pressure transmitter (15WV, 16WV, 17WV) installed directly by means of a mounting plate on the HP manifold.

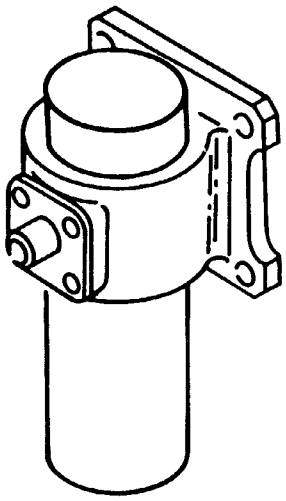
   The pressure transmitter also determines the color of the hydraulic synoptic lines on the display (green for normal pressure, amber for abnormal low pressure).

2. Component Location
   (Ref. Fig. 001)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
R	15WV	XMTR-BLUE HYD PRESS		147	734	29-32-22
	16WV	XMTR-YELLOW HYD PRESS		148	734	29-32-29
	17WV	XMTR-GREEN HYD PRESS		147	734	29-32-13



A



HYDRAULIC PRESSURE
TRANSMITTERS
15WV (2065)
16WV (3065)
17WV (1065)

BM5 29 32 00 0 BTMO - 13

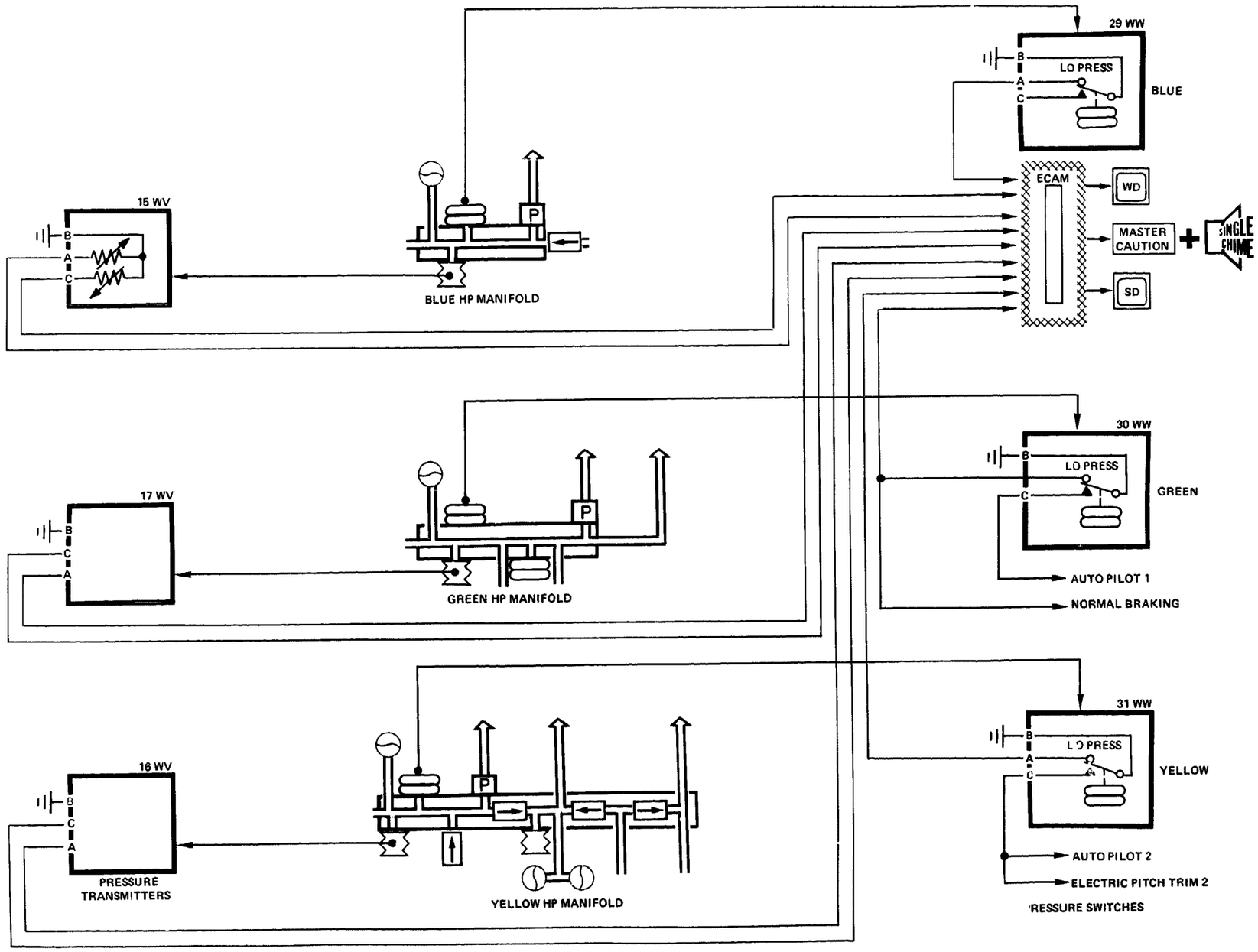
Component Location
Figure 001

R 3. Failure Indicating and Warnings (Ref. Fig. 002,)

A. Low pressure at the HP manifolds is signalled in each system by a pressure switch (29WW, 30WW, 31WW), installed directly on the manifold.
The switches activate :
(1)The ECAM display : indication in clear of :
(a)Primary failures
e.g. BLUE SYS LO PR
(b)Secondary failures
e.g. FLT CTL
SLATS SYS1 FAULT
(2)On CAPT and F/O main instrument panels 3VU and 5VU
- MASTER CAUTION lights come on.
- Single chime sounds.

B. Low pressure at the engine pumps is signalled by pressure switches, one on the delivery line of each engine pump. The switches activate :
(1)An amber LO PR legend on overhead panel 427VU, concurrently with the MASTER CAUTION lights come on on CAPT and F/O main instrument panels 3VU and 5VU.
(2)Single chime sounds.

INTENTIONALLY BLANK



BM5 29 32 00 0 AGMO – 12

HP Manifold Pressure Indicating
Figure 002

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INDADVERTENT OPERATION OF CONTROLS.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

BEFORE PROCEEDING WITH WORK ON ENGINE, MAKE CERTAIN THAT START-UP AND REVERSE THRUST CIRCUIT BREAKERS ARE OPEN.

INADVERTENT ENGINE START-UP OR OPERATION OF THRUST REVERSER CAN KILL OR SERIOUSLY INJURE PERSONNEL.

1. Operational Test

A. Reason for the Job

Green, Blue and Yellow hydraulic system pressure indicating and associated warnings test.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure

A. Hydraulic System Pressure Indicating and Associated Warnings Test.

(1)Job set-up

(a)Initial conditions :

1 Correct electrical power supply.

2 Forward services ventilation system in operation.

3 Connect hydraulic ground power supply cart to the three hydraulic ground connectors (Ref. 29-10-00, P. Block 301).

4 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		Line 108
21VU	SDAC and FWC2		Line 109
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG1/PUMP CTL/B	31GJ	331/V57

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/AUTO	153LP	323/M83

5 In flight compartment, place aircraft in the following configuration.
On HYD PWR Panel 427VU :
PUMPS ENG 1 and PUMPS ENG 2 pushbutton switches pressed (in), LO PR legends on.
ELEC PUMPS pushbutton switch released (out) ON and LO PR legends off.
PTU pushbutton switches released (out), ON legend off.

(2)Test
(a)Green hydraulic system.

ACTION	RESULT
1. On ECAM control panel, press HYD pushbutton switch.	On right ECAM display unit, HYD page appears.
2. On SERVO CTL of panel 428VU, make certain that B/G/Y JAM/OFF pushbutton switches are pressed (in) : OFF and JAM legends are off	B, Y and G/LO PR warning lights are on.
3. Using hydraulic ground power supply cart, slowly pressurize Green hydraulic system.	Check on HYD page, Green system, that for a pressure of 1750 PSI (121 bars) approx. G/LO PR warning light on servo CTL section of panel 428VU goes off.
4. Slowly depressurize Green hydraulic system.	On right ECAM display unit, pressure indication decreases. On SERVO CTL section of panel 428VU, check that G/LO PR warning light comes on for a pressure of 1450 PSI (100 bars)approx.

(b)Blue hydraulic system.
Perform preceding tests and make certain that similar results are obtained, adapted to system concerned.

(c)Yellow hydraulic system.
Perform preceding tests and make certain that similar results are obtained, adapted to system concerned.

(3)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Depressurize the three hydraulic systems and disconnect hydraulic ground power supply cart (Ref. 29-10-00, P. Block 301).

2. Functional Test

A. Reason for the Job
Hydraulic pressure indicating and associated warning check.
NOTE : The present functional test calls for a dry-motoring procedure.

B. Equipment and Materials

ITEM	DESIGNATION
	Access Platform, 2.6 m (8 ft. 6 in.)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 71-00-00, P. Block 501	Power Plant

C. Procedure
(1)Job set-up
(a)Initial conditions
1 Correct electrical power supply.
2 Forward services ventilation system in operation.
3 Make certain that the following circuit breakers are closed.

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		Line 108
21VU	SDAC and FWC2		Line 109
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	RSVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/AUTO	153LP	323/M83

4 Hydraulic reservoirs pressurized (Ref. 29-14-00, P. Block 301).
5 Correct hydraulic fluid level in reservoirs (Ref. 12-12-29, P. Block 1).
(b)In flight compartment, on panel 427VU, check or place the aircraft in the following configuration.
1 HYD PWR PUMPS ENG 1, PUMPS ENG 2 pushbutton switches released (out), OFF legend on.
2 ELEC PUMPS pushbutton switch released (out), ON and LO PR legends off.

3 PTU pushbutton switches released (out), ON legend off.
4 On panel 427VU, annunciators OVHT and AIR legends off.

(2)Tests

ACTION	RESULT
1. On center pedestal, on ECAM control panel, press HYD pushbutton switch.	HYD page appears on right ECAM display unit. Check that configuration enumerated above is correct.
2. On panel 427VU, press (in) both PUMPS ENG 1 pushbutton switches.	On panel 427VU OFF legends go off LO PR legends come on.
3. Dry motor engine 1 (Ref. 71-00-00, P. Block 501).	Green and Blue pressures increase. - When 1750 psi (121 bars) is reached : On right ECAM display unit, pressure indication turns green. - When 2200 psi (152 bars) is reached : On panel 427VU, LO PR legends of PUMPS ENG1 pushbutton switches go off. On right ECAM display unit, boxes symbolizing Green and Blue EDPs come on green and LO indication disappears.
4. Stop dry motoring procedure (Ref. 71-00-00, P. Block 501).	Green and Blue pressures decrease. - When 1800 psi (124 bars) is reached : On panel 427VU, LO PR legends of PUMPS ENG 1 pushbutton switches come on. On right ECAM display unit, boxes symbolizing Green and Blue EDPs come on amber and LO indication appears (amber). - When 1450 psi (100 bars) is reached : On right ECAM display unit, pressure indication turns amber.
5. When engine stops rotating.	On panel 427VU, LO PR legends of PUMPS ENG 1 pushbutton switches are on. On right ECAM display unit, HYD page, pressure indication is amber.
6. Perform same test for Green and Yellow systems with corresponding	

ACTION	RESULT
pushbutton switches (ENG 2).	
(3)Close-up (a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). (b)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.	

Ref. : MMEL 29-34-03 (HYD YELLOW (or BLUE or GREEN) PUMP 1(2) LO PR....OFF ECAM warning (FAA only))

CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Warning Notice
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Servicing
- 29-10-00, P. Block 501	Main Hydraulic Power - Adjustment/Test
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System - Servicing

B. Procedure

(1)Job set-up

(a)Open, safety and tag the following circuit breakers associated with engine pump pressure switch to be deactivated :

For engine 2 Yellow pump pressure switch 6GD :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	PTU CTL/G/Y	6GL	332/U60

For engine 1 Blue pump pressure switch 33GJ :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/Y	31GJ	331/V57
133VU	ENG 1 & 2/FIRE VALVES	101GK	334/S57
133VU	PTU CTL/G/B	1GL	332/U59

For engine 2 Green pump pressure switch 112GK :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58

For engine 1 Green pump pressure switch 113GK :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ENG/PUMPS/WARN	5GD	332/T57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57

(2)Procedure
(a)Depressurize associated hydraulic system (Ref. 29-10-00, P. Block 301).
(b)Depressurize associated system reservoir (Ref. 29-14-00, P. Block 301).
R (c)Display a warning notice on HYD PWR panel 427VU prohibiting operation of the system associated with engine pump pressure switch to be deactivated.
(d)Open access doors :
- For engine 1 : 473AL.
- For engine 2 : 483AL.
(e)Cut and remove lockwire and disconnect associated electrical connector.
(f)Use a tie-wrap and attach the cable to a part of the structure. Make sure that oil or other liquids cannot go into the connector end.
(g)Close access doors.
(h)Close relevant circuit breakers.
(j)Dry motor related engine and check that pressure reading on right ECAM display unit is approx. 3000 ± 200 psi (206 ± 13.5 bars) (Ref. 29-10-00, P. Block 501).
R (k)In flight compartment, on HYD PWR panel 427VU, display a temporary placard to warn the flight crew that the YELLOW (or BLUE or GREEN) PUMP 1(2) LO PR....OFF ECAM warning is inoperative.
(3)Close-up
(a)Make an entry in the aircraft technical log.
(b)Remove the warning notice.

2. Reactivation

A. Refer to TSM 29-32.

B. Remove temporary placard in flight compartment.

HYDRAULIC PRESSURE TRANSMITTER-GREEN 17WV (BLUE 15WV-YELLOW 16WV) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Container
B.	Circuit Breaker Safety Clips
C.	Warning Notices
D. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Reservoir Replenishing
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power

2. Procedure

NOTE : Removal/Installation of Blue and Yellow hydraulic pressure transmitters (15WV and 16WV) respectively is covered in this topic.

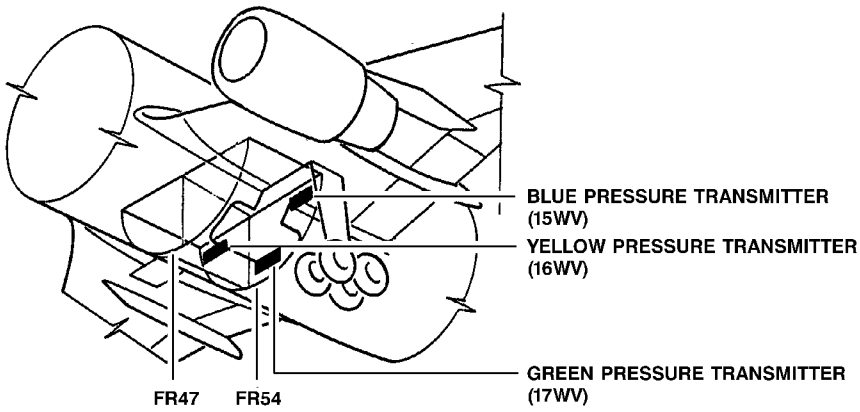
A. Job Set-Up (Ref. Fig. 401)

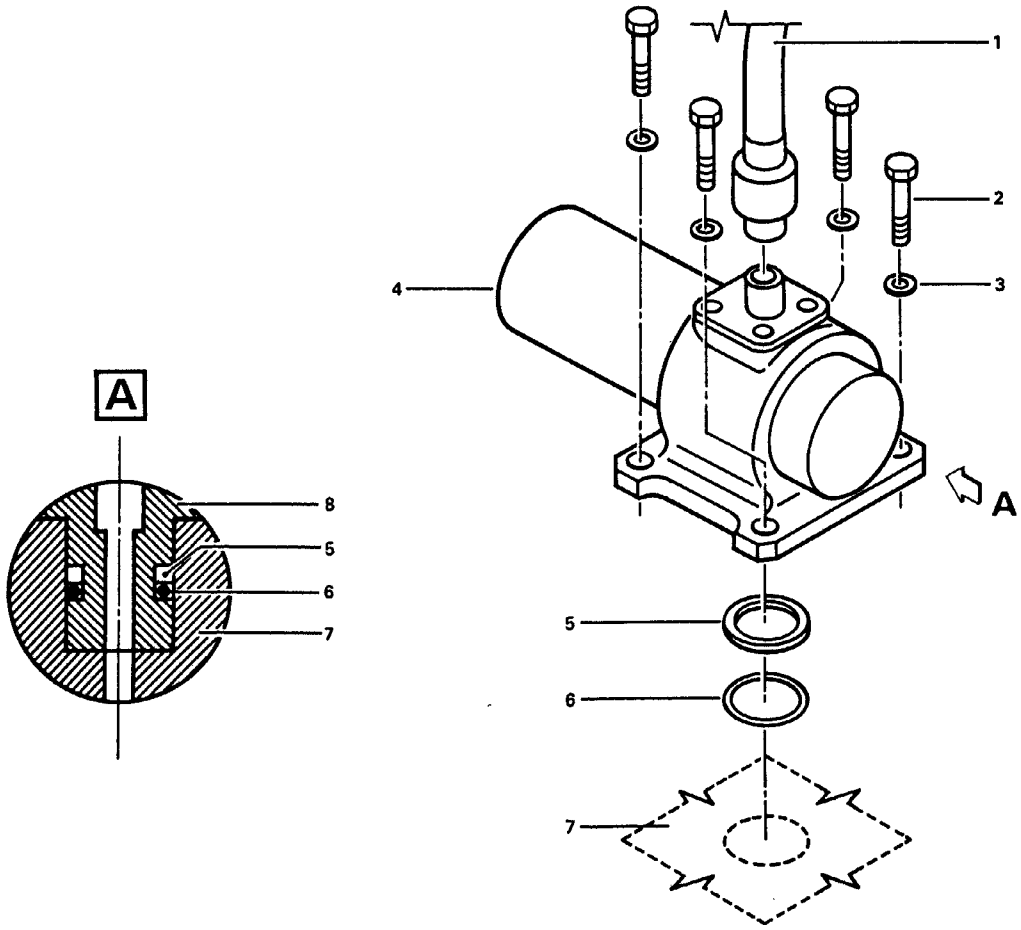
(1) On panel 427VU,
- place a warning notice prohibiting operation of Green, Blue and Yellow systems.

(2) Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B08
101VU	HYD PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL&/CARGO DOOR/PUMP	7GX	333/T51

R (3) Open access doors 147AL, 571DB and 671DB to Green, Blue and Yellow ground
R connectors respectively.
R (4) Place a warning notice on ground connectors prohibiting pressurization of
R Green, Blue and Yellow systems.





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Pressure Transmitters
Figure 401

R

R (5)Open main gear doors (Ref. 32-12-11, P. Block 301).
R NOTE : - To access to Blue hydraulic pressure transmitter (15WV), it is not necessary to open left main gear door.
R - To access to Green hydraulic pressure transmitter (17WV), open left main gear door.
R - To access to Yellow hydraulic pressure transmitter (16WV), open right main gear door.
R (6)Depressurize Green, Blue or Yellow reservoir, according to transmitter to be removed (Ref. 29-14-00, P. Block 301).
R (7)Depressurize Green, Blue or Yellow system (Ref. 29-10-00, P. Block 301).
R (8)Install container below transmitter to be removed.

R B. Removal
R (1)Disconnect electrical plug (1).
R (2)Cut and remove lockwire and remove four screws (2) and four washers (3).
R (3)Remove transmitter (4).
R (4)Remove back-up ring (5) and O-ring seal (6) on pressure union (8).

R C. Preparation of Replacement Component
R (1)Insert new back-up ring (5) on pressure union (8) if necessary.
R (2)Insert new O-ring seal (6) on pressure union (8).
R NOTE : -Back-up ring (5) can be split for easier installation.
R -O-ring seal (6) must be lubricated with material 02-003.

R D. Installation
R (1)Position replacement transmitter (4) on manifold (7).
R (2)Install four washers (3) and four screws (2).
R (3)Tighten and wirelock four screws (2).
R (4)Connect electrical plug (1).

R E. Test
R (1)Pressurize hydraulic reservoir associated with removed pressure transmitter (Ref. 29-14-00, P. Block 301).
R (2)Pressurize hydraulic system associated with removed pressure transmitter using hydraulic ground power cart (Ref. 29-10-00, P. Block 301) or auxiliary power (Ref. 29-21-00, P. Block 301, 29-22-00, P. Block 301, 29-23-00, P. Block 301).
R NOTE : Check that pressure reading on right ECAM display unit is approx. 3000 ± 200 psi (206 ± 13.5 bars).
R (3)Check for hydraulic fluid leakage at pressure transmitter.

R F. Close-Up
R (1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 1GL, 6GL, 7GX.
R (2)Remove container.
R (3)Check fluid level in reservoir, and top up as required (Ref. 12-12-29, P. Block 301).
R (4)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
R (5)Remove warning notices and close access doors to ground connectors.

PRESSURE GAGE - ACCUMULATOR (291072, 292072, 293072)
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Blanking Plugs/Caps
(3)	Warning Notices
(4)	Access Platform, 2.6 m (8 ft. 8 in.)
Referenced Procedures	
- 12-14-29, P. Block 1	Nitrogen Charging of Hydraulic Accumulators
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)On panel 427VU :
- display a warning notice prohibiting operation of Green, Blue and Yellow systems.
(3)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN/	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Position access platform.
(6)Open access doors to hydraulic ground connectors and display warning notice to prohibit hydraulic system pressurization :
- for Green system : 147AL
- for Blue system : 571DB
- for Yellow system : 671DB.

R (7)Depressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301) and prohibit its pressurization by displaying a warning notice :
- on panel 429VU, to prohibit APU starting
- on hydraulic reservoir pressurization connector.

R (8)Depressurize related hydraulic system using manual decompression push-button located on pressure manifold (Ref. 29-10-00, P. Block 301) :
- for Green system, pushbutton 1063 located on pressure manifold 1060
- for Blue system, pushbutton 2063 located on pressure manifold 2060
- for Yellow system, pushbutton 3063 located on pressure manifold 3060.

R B. Green Accumulator Pressure Gage

R (1)Removal of Green accumulator pressure gage

R (a)Depressurization of Green accumulator
(Ref. Fig. 401)
1 Remove cap from valve (6).
2 Loosen locknut of valve (6).
3 Release pressure by operating valve (6).
4 Make certain that pressure read on pressure gage (1) is zero.

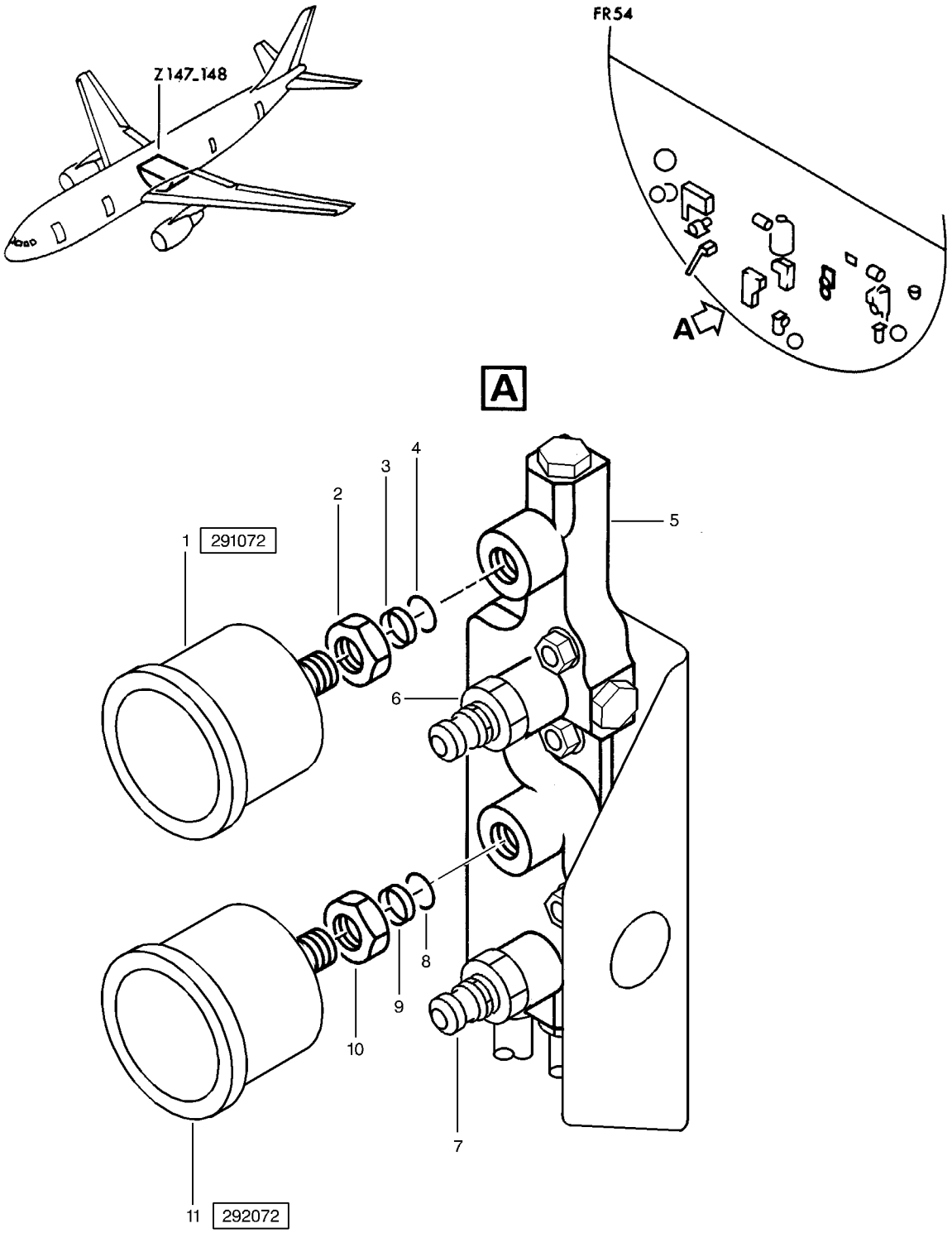
(b)Removal of Green accumulator pressure gage
(Ref. Fig. 401)
1 Loosen nut (2).
2 Remove pressure gage (1).
3 Remove and discard packing (4) and packing washer (3).
4 Remove and retain nut (2) of pressure gage (1).
5 Put blanking plugs on disconnected line ends.

(2)Installation of Green accumulator pressure gage
(Ref. Fig. 401)
(a)Remove blanking plug from pressure gage (1).
(b)Make certain that parts retained from removed component are clean and in correct condition.
(c)Install nut (2) on pressure gage (1).
(d)Install new packing washer (3) and new packing (4) on pressure gage (1).
(e)Clean component interface and/or adjacent area.
(f)Do a visual inspection of component interface and/or adjacent area.
(g)Remove blanking plug from disconnected line end.
(h)Install pressure gage (1) on manifold (5).
(i)Turn pressure gage (1) so that you can read the pressure easily.
(j)Hold pressure gage (1) and tighten nut (2).

C. Blue Accumulator Pressure Gage

(1)Removal of Blue accumulator pressure gage

(a)Depressurization of Blue Accumulator
(Ref. Fig. 401)



Green and Blue Accumulator Pressure Gages
Figure 401

1 Remove cap from valve (7).
2 Loosen locknut of valve (7).
3 Release pressure by operating valve (7).
4 Make certain that pressure read on pressure gage (11) is zero.

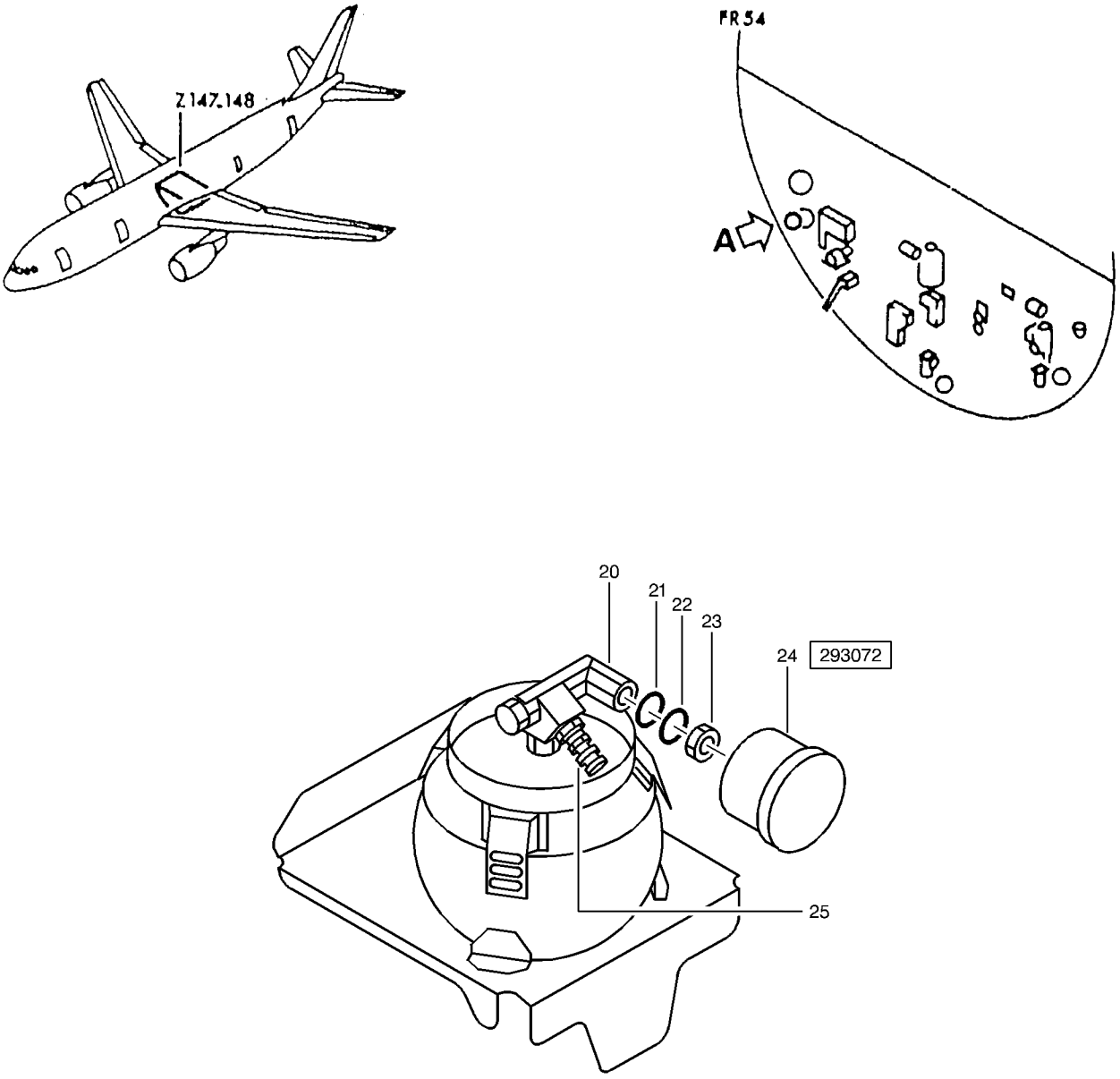
(b)Removal of Blue accumulator pressure gage
(Ref. Fig. 401)
1 Loosen nut (10).
2 Remove pressure gage (11).
3 Remove and discard packing (8) and packing washer (9).
4 Remove and retain nut (10) of pressure gage (11).
5 Put blanking plugs on disconnected line ends.

(2)Installation of Blue accumulator pressure gage
(Ref. Fig. 401)
(a)Remove blanking plug from pressure gage (11).
(b)Make certain that parts retained from removed component are clean and in correct condition.
(c)Install nut (10) on pressure gage (11).
(d)Install new packing washer (9) and new packing (8) on pressure gage (11).
(e)Clean component interface and/or adjacent area.
(f)Do a visual inspection of component interface and/or adjacent area.
(g)Remove blanking plug from disconnected line end.
(h)Install pressure gage (11) on manifold (5).
(i)Turn pressure gage (11) so that you can read the pressure easily.
(j)Hold pressure gage (11) and tighten nut (10).

D. Yellow Accumulator Pressure Gage
(1)Removal of Yellow accumulator pressure gage
(a)Depressurization of Yellow accumulator
(Ref. Fig. 402)
1 Remove cap from valve (25).
2 Loosen locknut of valve (25).
3 Release pressure by operating valve (25).
4 Make certain that pressure read on pressure gage (24) is zero.

(b)Removal of Yellow accumulator pressure gage
(Ref. Fig. 402)
1 Loosen nut (23).
2 Remove pressure gage (24).
3 Remove and discard packing (21) and packing washer (22).
4 Remove and retain nut (23) of pressure gage (24).
5 Put blanking plugs on disconnected line ends.

(2)Installation of Yellow accumulator pressure gage
(Ref. Fig. 402)
(a)Remove blanking plug from pressure gage (24).
(b)Make certain that parts retained from removed component are clean and in correct condition.
(c)Install nut (23) on pressure gage (24).
(d)Install new packing washer (22) and new packing (21) on pressure gage (24).
(e)Clean component interface and/or adjacent area.



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Yellow Accumulator Pressure Gage
Figure 402

(f)Do a visual inspection of component interface and/or adjacent area.
(g)Remove blanking plug from disconnected line end.
(h)Install pressure gage (24) on manifold (20).
(i)Turn pressure gage (24) so that you can read the pressure easily.
(j)Hold pressure gage (24) and tighten nut (23).

E. Tests
(1)Charge accumulator (Ref. 12-14-29, P. Block 1).
(2)Pressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(3)Pressurize related hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Check for hydraulic fluid and nitrogen leakage at manifold unions.
(5)Make certain that pressure is stable.
(6)Make certain that caps on related valves are installed.

F. Close-up
(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 1GL, 6GL and 7GX.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Close main landing gear doors (Ref. 32-12-11, P.Block 301).
(5)Remove warning notices and close access doors to hydraulic ground connectors.
(6)Remove access platform.

BLUE HYDRAULIC PRESSURE TRANSMITTER 15 WV - REMOVAL/INSTALLATION

Removal/Installation of Blue hydraulic pressure transmitter 15 WV is dealt with in topic 29-32-13, P. Block 401.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS MAKE CERTAIN THAT HYDRAULIC SYSTEM UNDER MAINTENANCE HAS BEEN ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs
C.	Warning Notices
D.	Access Platform, 2.6 m (8 ft. 8 in.)
E.Material No. 19-010	Corrosion - Resistant Steel Lockwire 0.8 mm (0.032 in.) (Ref. 20-31-00)
Referenced Procedures	
- 12-14-29, P. Block 1	Nitrogen Charging of Hydraulic Accumulators
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)On panel 427VU :
- Display a warning notice prohibiting operation of Green, Blue and Yellow systems.
(3)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN/	4GE	331/V60
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51

(4)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Install access platform.
(6)Open access doors to hydraulic ground connectors and display warning notice to prohibit hydraulic system pressurization :
- for Green system : 147AL
- for Blue system : 571DB
- for Yellow system : 671DB.

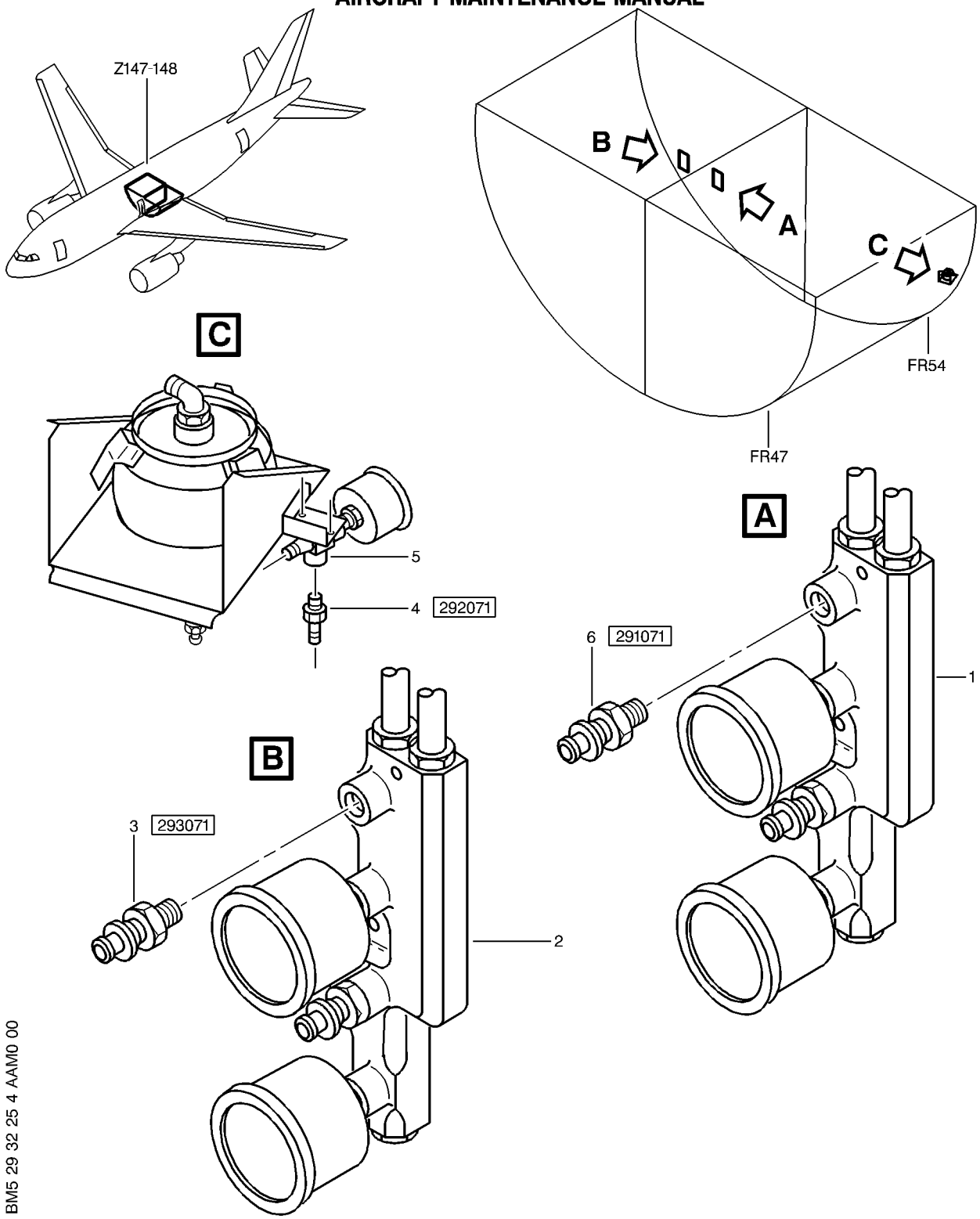
(7)Depressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301) and prohibit its pressurization by displaying a warning notice :
- on panel 429VU, to prohibit APU starting
- on hydraulic reservoir pressurization connector.

(8)Depressurize related hydraulic system using manual decompression push-button located on pressure manifold (Ref. 29-10-00, P. Block 301) :
- for Green system, pushbutton 1063 located on pressure manifold 1060
- for Blue system, pushbutton 2063 located on pressure manifold 2060
- for Yellow system, pushbutton 3063 located on pressure manifold 3060.

(Ref. Fig. 401)

B. Green Accumulator Air Charging Valve
(1)Removal of Green accumulator air charging valve
(a)Depressurization of Green accumulator
1 Remove cap from valve (6).
2 Loosen locknut of valve (6).
3 Release pressure by operating valve (6).
4 Make certain that pressure read on pressure gage is zero.
(b)Removal of Green accumulator air charging valve
1 Cut and remove lockwire.
2 Remove air charging valve (6).
3 Put blanking plugs on valve and manifold port.
(2)Installation of Green accumulator air charging valve.
(a)Remove blanking plugs from valve and manifold port.
(b)Make certain that parts retained from removed component are clean and in correct condition.
(c)Install air charging valve (6) on manifold (1) and tighten.
(d)Safety with lockwire (Material No. 19-010).

C. Blue Accumulator Air Charging Valve
(1)Removal of Blue accumulator air charging valve
(a)Depressurization of Blue Accumulator
1 Remove cap from valve (4).
2 Loosen locknut of valve (4).
3 Release pressure by operating valve (4).
4 Make certain that pressure read on pressure gage is zero.
(b)Removal of Blue accumulator air charging valve
1 Cut and remove lockwire.
2 Remove air charging valve (4).
3 Put blanking plugs on valve and manifold port.
(2)Installation of Blue accumulator air charging valve
(a)Remove blanking plugs from valve and manifold port.
(b)Make certain that parts retained from removed component are clean and



Accumulator Air Charging Valve
Figure 401

in correct condition.
(c)Install air charging valve (4) on manifold (5) and tighten.
(d)Safety with lockwire (Material No. 19-010).

D. Yellow Accumulator Air Charging Valve
(1)Removal of Yellow accumulator air charging valve
(a)Depressurization of Yellow accumulator
1 Remove cap from valve (3).
2 Loosen locknut of valve (3).
3 Release pressure by operating valve (3).
4 Make certain that pressure read on pressure gage is zero.
(b)Removal of Yellow accumulator air charging valve
1 Cut and remove lockwire.
2 Remove air charging valve (3).
3 Put blanking plugs on valve and manifold port.
(2)Installation of Yellow accumulator air charging valve
(a)Remove blanking plugs from valve and manifold port.
(b)Make certain that parts retained from removed component are clean and in correct condition.
(c)Install air charging valve (3) on manifold (2) and tighten.
(d)Safety with lockwire (Material No. 19-010).

E. Tests
(1)Remove warning notices.
(2)Charge accumulator (Ref. 12-14-29, P. Block 1).
(3)Pressurize related hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(4)Pressurize related hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Check for hydraulic fluid and nitrogen leakage at air charging valves and manifold unions.
(6)Make certain that pressure is stable.
(7)Make certain that caps are installed on related valves.

F. Close-up
(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 4GE, 1GL, 6GL and 7GX.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove warning notices and close access doors to hydraulic ground connectors :
- for Green system : 147AL
- for Blue system : 571DB
- for Yellow system : 671DB.
(5)Close main landing gear doors (Ref. 32-12-11, P. Block 301).
(6)Remove access platform.

YELLOW HYDRAULIC PRESSURE TRANSMITTER 16 WV - REMOVAL/INSTALLATION

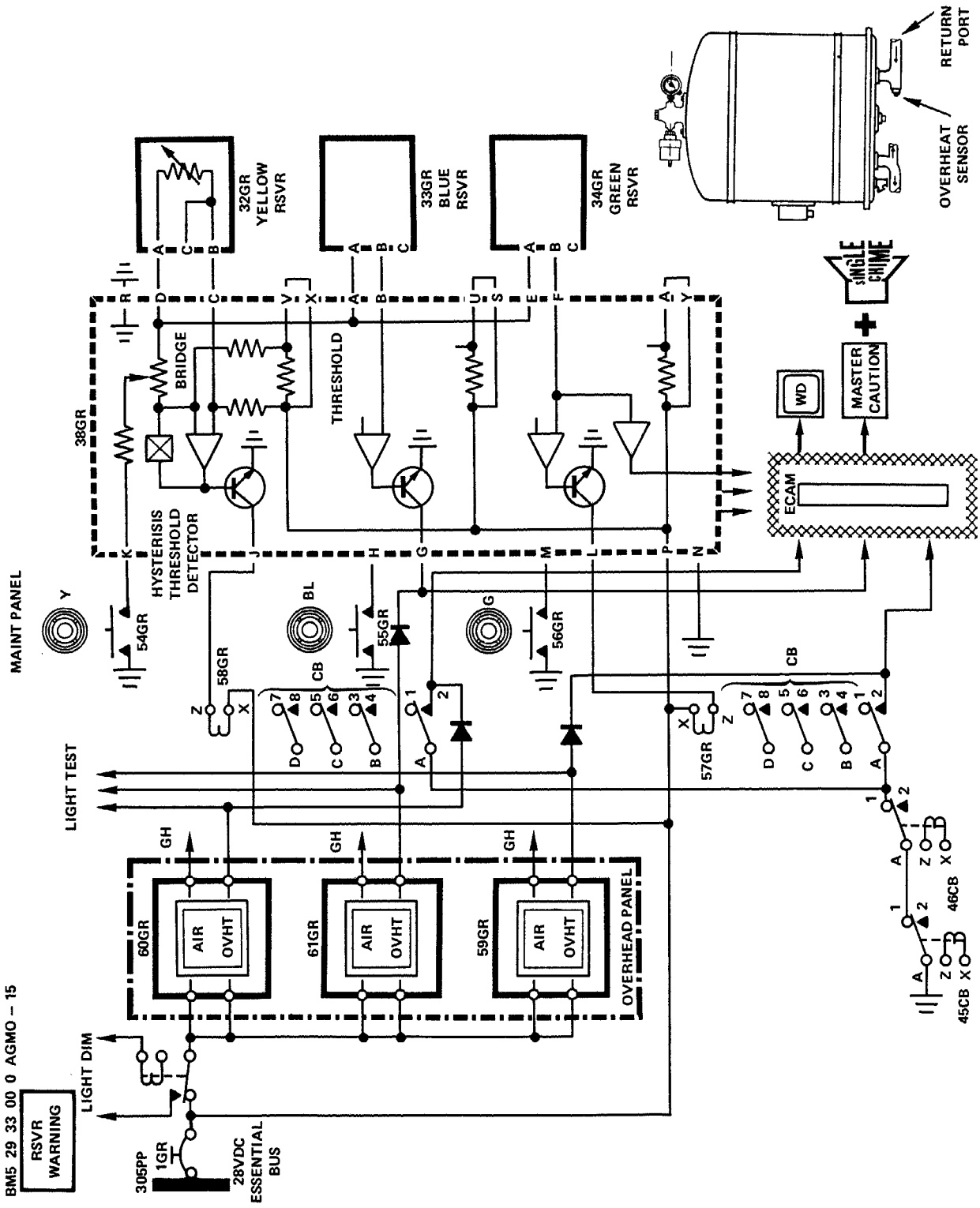
Removal/Installation of Yellow hydraulic pressure transmitter 16 WV is dealt with in topic 29-32-13, P. Block 401.

HYDRAULIC FLUID TEMPERATURE INDICATING - DESCRIPTION AND OPERATION

1. Description

A. In each system, a resistor type overheat sensor (32GR, 33GR, 34GR) on the return line at the reservoir provides signals, through an electronic overheat monitoring unit, 38GR, which allow :
(1) Illumination of an amber OVHT warning light on overhead panel 427VU when hydraulic fluid temperature exceeds 95°C (203°F).
(2) On CAPT and F/O main instrument panels 3VU and 5VU, illumination of MASTER CAUTION light.
(3) Activation of the aural warning.
(4) Indication of the primary failure and secondary failures on the ECAM display.

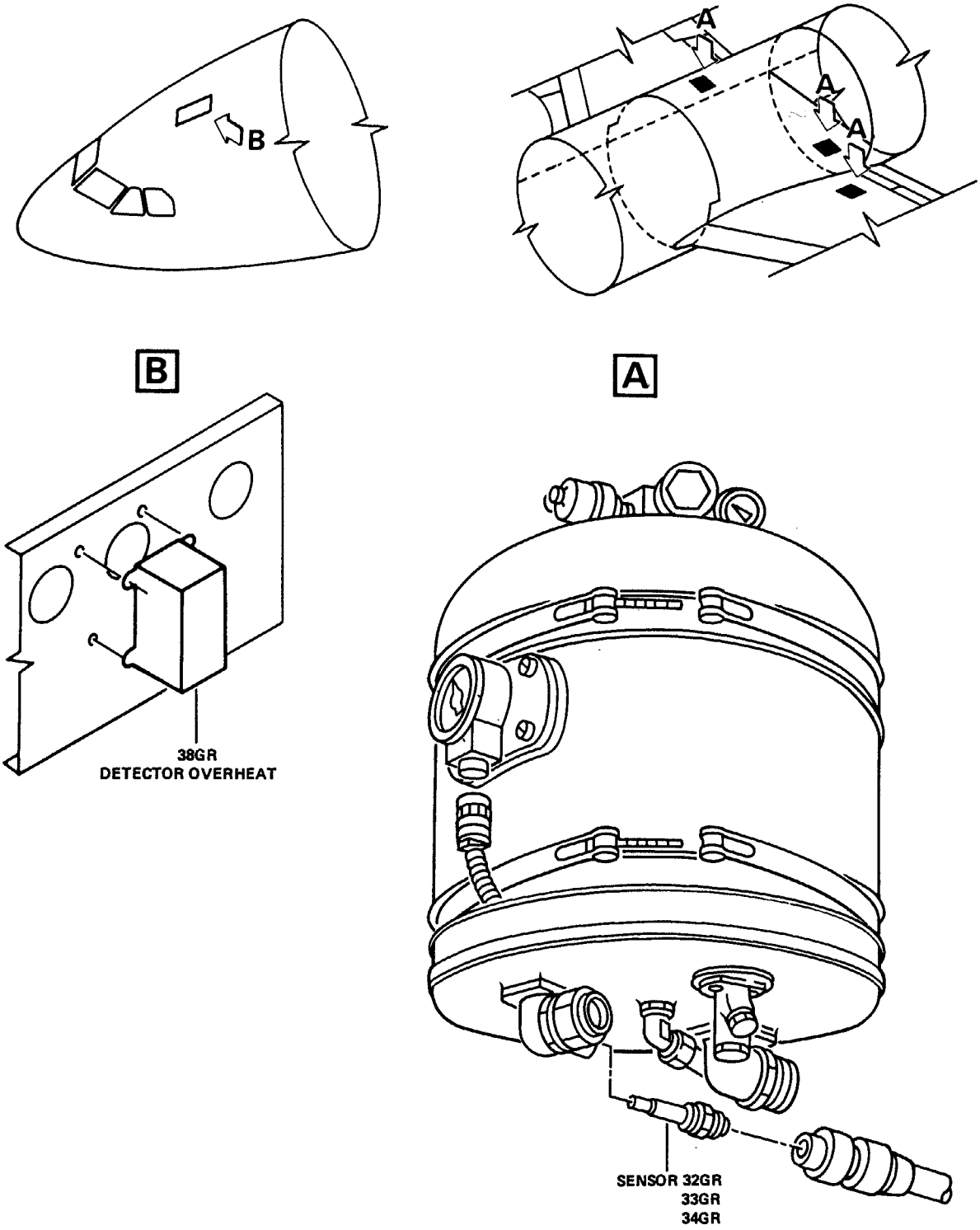
B. A test pushbutton switch (54GR, 55GR, 56GR) on the maintenance panel is provided for each overheat sensor to check the sensor for electrical continuity.
(Ref. Fig. 001)



Overheat Monitoring
Figure 001

2. Component Location
(Ref. Fig. 002)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	32GR	SENSOR-RSVR OVHT		147	734	29-33-11
R	33GR	SENSOR-RSVR OVHT		571	571BB	29-33-11
R	34GR	SENSOR-RSVR OVHT		671	671BB	29-33-11
	38GR	MONITORING UNIT-RSVR OVHT		122	121BL	29-33-12



Component Location
Figure 002

1. Operational Test

A. Reason for the Job
(1)Test of hydraulic fluid temperature annunciator lights.
(2)Test of hydraulic fluid temperature monitoring system.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job Set-Up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM		Line 108
21VU	SDAC and FWC2		Line 109
133VU	FLT CTL/SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	ENG/PUMPS/WARN	5GD	333/T57
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	RAT/TEST	1GF	331/V59
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
133VU	YELLOW/BRK/TRIPLE/PRESS/IND	70GG	333/T60
133VU	ENG1 & 2/FIRE VALVES	101GK	334/S57
133VU	ENG1 & 2/FIRE VALVES	103GK	334/S58
133VU	SRVR/QTY/IND	1GQ	333/T59
133VU	RSVR/WARN	1GR	333/T58
132VU	INT LT/ANN LT/TEST/MAN	149LP	324/L82
132VU	INT LT/ANN LT/TEST/MAN	2LP	324/L81
132VU	INT LT/ANN LT/TEST/MAN	1LP	324/L80
132VU	INT LT/ANN LT/TEST/AUTO	153LP	323/M83

(d)On HYD PWR panel 427VU, on B RSVR, G RSVR and Y RSVR annunciators, make certain that OVHT legend is off.
(e)In flight compartment, on HYD PWR panel 427VU, make certain that aircraft is in the following configuration:

1 PUMPS ENG 1 and PUMP ENG 2 pushbutton switches pressed (in).
2 ELEC PUMPS pushbutton switch released (out), ON and LO PR legends off.
3 PTU pushbutton switches released (out), ON legends off.
NOTE : In order to perform an effective check and thus to avoid G and Y OVHT warning lights inhibition which may be caused by possible stall detection of G or Y THS actuator, place aircraft in following configuration:
- On SERVO CTL section of PANEL 428VU
Release G and Y pushbutton switches, associated OFF legends come on, and LO PR warning lights remain on (B pusbhbutton switch is pressed, OFF legend off and LO PR warning comes on).
- On SERVO CTL Section of panel 471VU
Press G and Y pushbutton switches
Associated TEST legends come on and remain on.

(2)Test
(a)Test of OVHT warning lights.

ACTION	RESULT
1. In flight compartment, on AIR BLEED panel 436VU, place ANN LT switch in TEST position.	On HYD PWR panel 427VU, OVHT legend corresponding to each hydraulic system comes on. Other legends are not to be taken into account.
2. Place ANN LT switch in BRT position	OVHT warning light corresponding to each hydraulic system goes off.

(b)Test of temperature monitoring system.

ACTION	RESULT
1. In flight compartment, on center pedestal ECAM control panel, press HYD pushbutton switch	On R ECAM display unit, HYD page appears. Check that configuration enumerated above is correct.
2. On HYD PWR section of maintenance panel 471VU, press and hold RSVR OVHT TEST/G pushbutton switch	On HYD PWR panel 427VU, OVHT legend of G RSVR annunciator comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - single chime sounds On left ECAM display unit, HYD-GREEN RSVR OVHT warning message appears.
3. Release RSVR OVHT TEST/G pushbutton switch	On panel 427VU, OVHT legend of G RSVR annunciator goes off.

ACTION	RESULT
	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off On left ECAM display unit, HYD-GREEN RSVR OVHT warning message disappears.

4. Perform tests described in steps 2 and 3 by operating RSVR OVHT TEST/B and Y pushbutton switches respectively.
   (3)Close-Up
   (a)On SERVO CTL section of panel 471VU, release G and Y pushbutton switches. Associated test legends go off.
   (b)On SERVO CTL section of panel 428VU, press G and Y pushbutton switches. Associated off legends go off and LO PR warning lights remain on.
   (c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

RESERVOIR OVERHEAT SENSOR 32GR-33GR-34GR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 8 in.)
B.	Blanking Plugs/Caps
C. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-33-00, P. Block 501	Hydraulic Fluid Temperature Indicating
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up

(1) Open main gear main door (Ref. 32-12-11, P. Block 301).

(2) For removal of Green system reservoir overheat sensor.

(a) In flight compartment, on **HYD PWR** panel 427VU, make certain that Green hydraulic power system is in the following configuration :

1 **ELEC PUMPS** pushbutton switch released (out).

2 **G/PUMPS ENG 1** and **PUMPS ENG 2** pushbutton switches released (out).

(3) For removal of Blue system reservoir overheat sensor :

(a) In flight compartment, on **HYD PWR** panel 427VU, make certain that Blue hydraulic power system is in the following configuration :

1 Green/Blue system **PTU** pushbutton switch released (out).

2 **B/PUMPS ENG 1** pushbutton switch released (out).

(4) For removal of Yellow system reservoir overheat sensor :

(a) In flight compartment, on **HYD PWR** panel 427VU, make certain that Yellow hydraulic power system is in the following configuration :

1 Green/Yellow system **PTU** pushbutton switch released (out).

2 **Y/PUMPS ENG 2** pushbutton switch released (out).

(b) On mechanical center pedestal 9VU, display a warning notice prohibiting operation of yellow electric pump.

(c) Open access door to hand pump in zone 812 and display warning notice prohibiting operation of hand pump 293085.

(5) Depressurize concerned hydraulic system (Ref. 29-10-00, P. Block 301).

(6) Depressurize reservoir concerned (Ref. 29-14-00, P. Block 301). Leave depressurizing equipment connected to reservoir.

(7) Install a warning notice on appropriate ground connector prohibiting replenishing of reservoir associated with sensor to be removed.

(8) Drain hydraulic reservoir associated with sensor to be removed (Ref. 29-00-00, P. Block 301).

(9) Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/WARN	1GR	333/T58
	- For removal of Green system reservoir overheat sensor		
133VU	ENG1/PUMP CTL/G	99GK	331/V58
133VU	ENG2/PUMP CTL/G	100GK	332/U58
133VU	ELEC/PUMPS/WARN	4GE	331/V60
	- For removal of Blue system reservoir overheat sensor		
133VU	PTU CTL/G/B	1GL	332/U59
133VU	ENG1/PUMP CTL/B	31GJ	331/V57
	- For removal of Yellow system reservoir overheat sensor		
133VU	PTU CTL/G/Y	6GL	332/U60
133VU	ENG2/PUMP CTL/Y	1GD	332/U57
133VU	RAT/TEST	1GF	331/V59
133VU	ACCU PRESS/CTL &/CARGO DOOR/PUMP	7GX	333/T51
101VU	ELEC/HYD/PUMP	23GX	GEN2/B8

(10)Open access door :
(a)571BB for removal of Blue system reservoir overheat sensor.
(b)671BB for removal of Yellow system reservoir overheat sensor.

B. Removal

(Ref. Fig. 401)

(1)Disconnect electrical connector (1) from sensor (2).
(2)Cut and remove lockwire. Remove sensor (2) and discard seal (3).
(3)Install blanking plugs/caps on reservoir port.

C. Installation

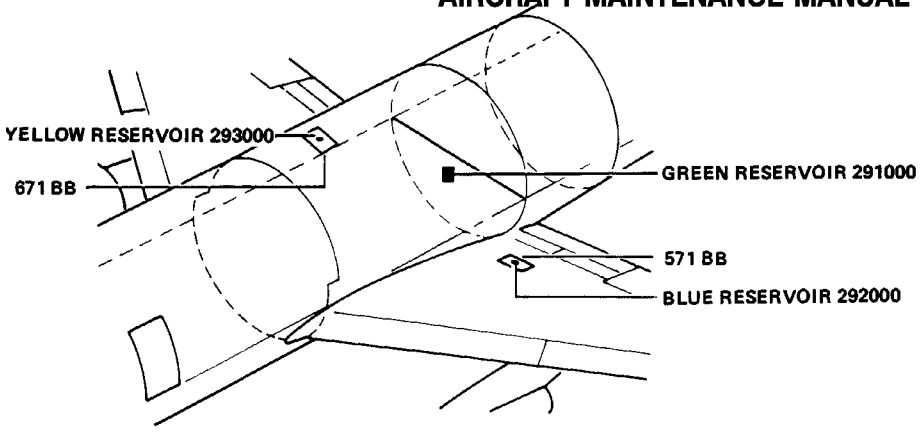
(1)Remove blanking plugs/caps
(2)Install sensor (2) equipped with new seal (3), previously coated with hydraulic fluid No. 02-003.
(3)TORQUE sensor to 2.5 m.daN (18 lbf.ft.). Wirelock.
(4)Connect electrical connector (1).
(5)Pressurize hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(6)Top up hydraulic reservoir (Ref. 12-12-29, P. Block 1).

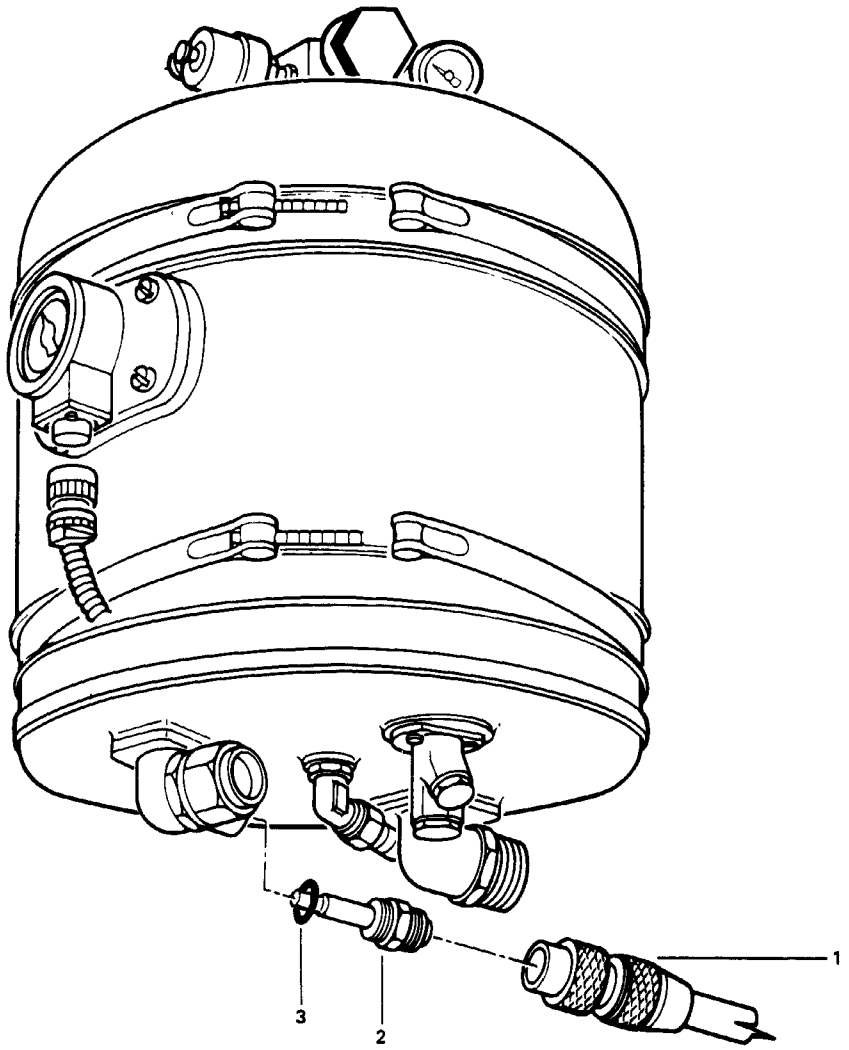
D. Tests

(1)Remove safety clips and tags and close circuit breaker 1GR.
(2)Perform operationaltest (Ref. 29-33-00, P. Block 501).
(3)Check sensor installation for leakage.

E. Close-Up

(1)Clean any trace of hydraulic fluid.
(2)Close access doors :
(3)Remove warning notices.
(4)Remove access platform.
(5)Close main gear main door (Ref. 32-12-11, P. Block 301).





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Hydraulic Fluid Overheat Sensor
Figure 401

RESERVOIR OVERHEAT MONITORING UNIT 38GR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.6 m (8 ft. 8 in.)
(2)	Blanking Caps
(3)	Circuit Breaker Safety Clips
Referenced Procedure - 29-33-00, P. Block 501	Hydraulic Fluid Temperature Indicating

2. Procedure (Ref. Fig. 401)

A. Job Set-up

(1)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
133VU	RSVR/WARN	1GR	333/T58

(2)Install the access platform at the access door 121BL.

(3)Open the access door 121BL.

B. Removal

(1)Disconnect the electrical connector (5).

(2)Put a blanking cap on the electrical connector (5).

(3)Remove the four screws (4) with the washers (3).

(4)Remove the monitoring unit (2) from the mounting plate (1).

C. Installation

(1)Install the monitoring unit (2) on the mounting plate (1) with the four screws (4) and washers (3).

(2)Tighten the screws (4).

(3)Remove the blanking cap from the electrical connector (5).

(4)Check the electrical connector (5) for correct condition and cleanliness.

(5)Connect the electrical connector (5) to the monitoring unit (2).

D. Test

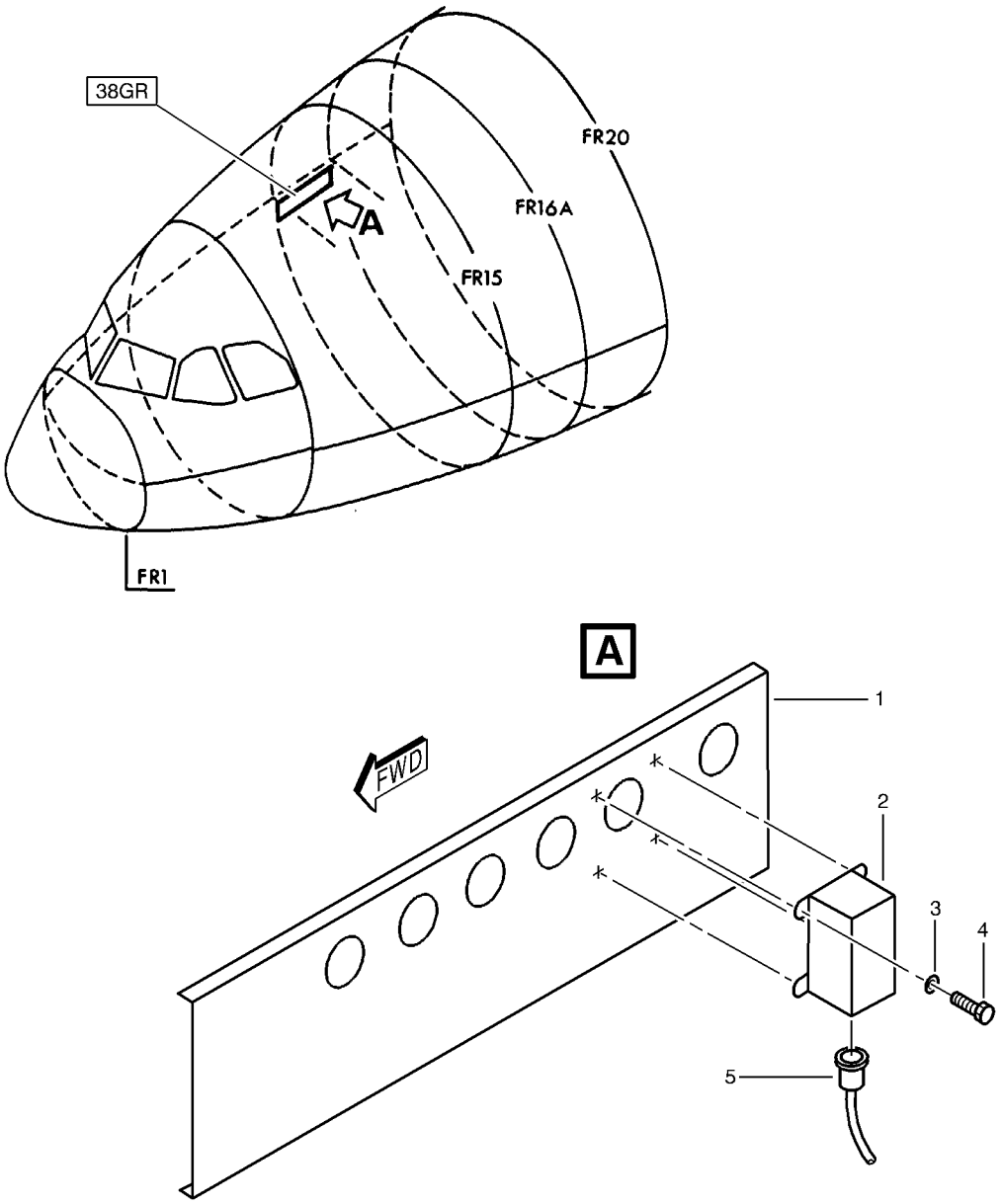
(1)Remove the safety clips and tags and close circuit breaker 1GR.

(2)Perform an operational test (Ref. 29-33-00, P. Block 501).

E. Close-up

(1)Close the access door 121BL.

(2)Remove the access platform.



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Reservoir Overheat Monitoring Unit
Figure 401

RESERVOIR PRESSURIZATION INDICATING - DESCRIPTION AND OPERATION

1. Description

Pressure switch on the pressurization manifold of each reservoir provides a signal in the event of low air pressure (1.5 bar (21.7 psi) relative) allowing :

A. Illumination of an amber light **AIR 60GR, 59GR, 61GR** on overhead panel 427VU.

B. On CAPT and F/O main instrument panels 3VU and 5VU. **MASTER CAUTION** lights come on.

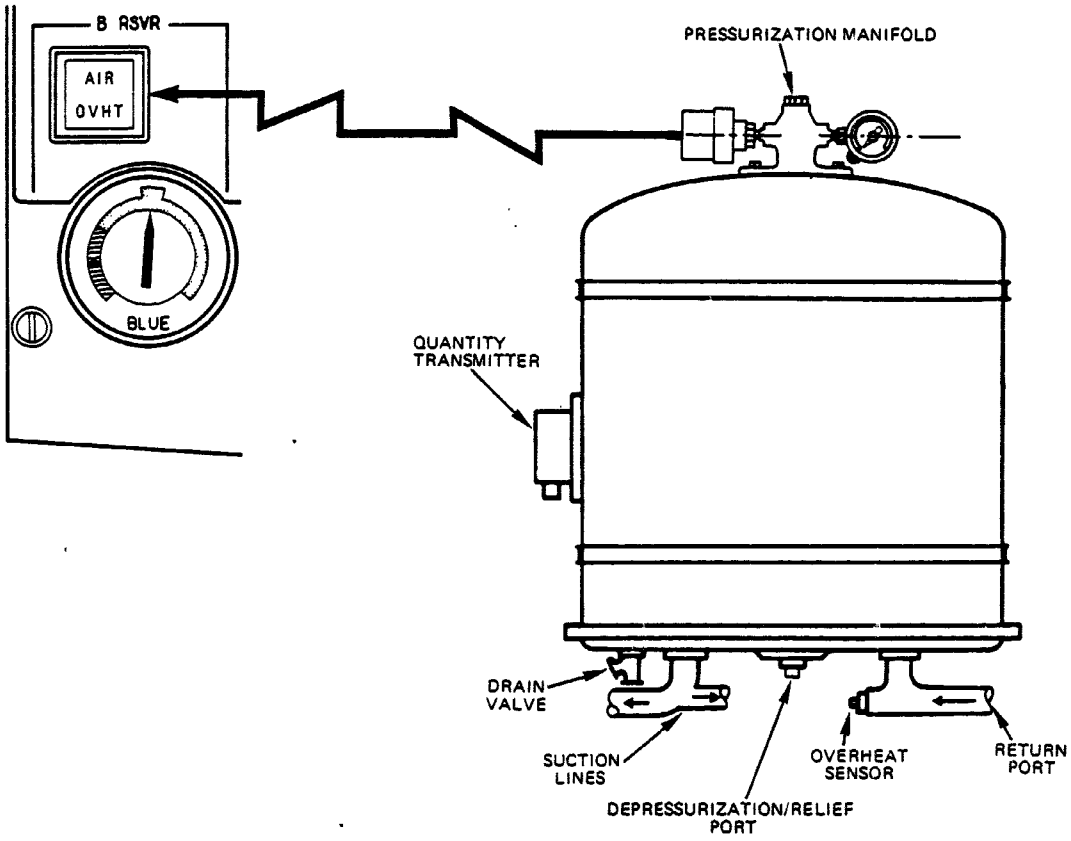
C. Indication of reservoir low air pressure (e.g. **BLUE RSVR LO AIR PRESS**) on the ECAM display.

D. Activation of the aural warning
Warning light goes off for a max. pressure of 1.7 bar (24.6 psi) (pressure increasing).
NOTE : A direct reading air pressure gage is mounted on the pressurization manifold of each reservoir.
(Ref. Fig. 001)
(Ref. Fig. 002)

2. Component Location

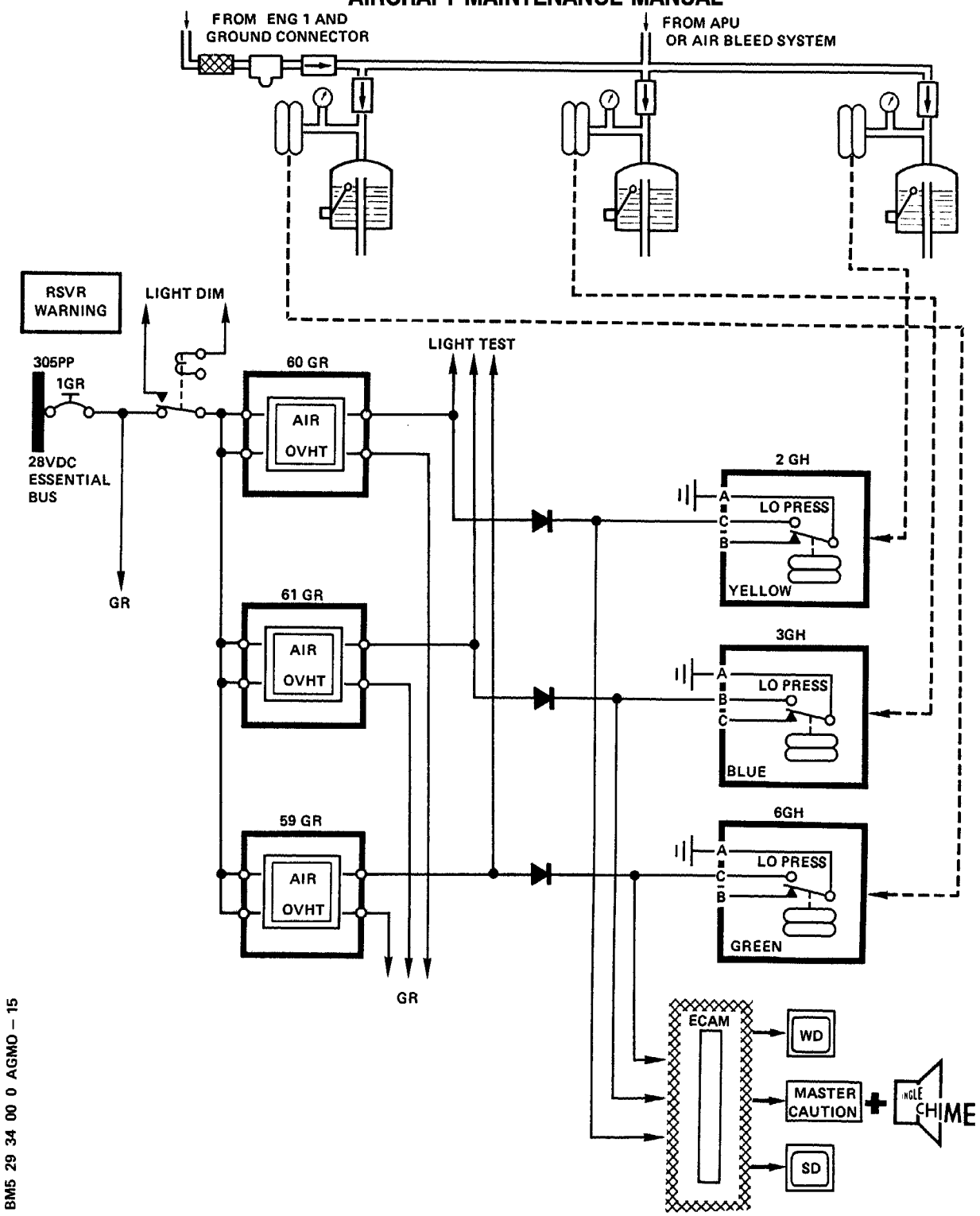
(Ref. Fig. 003)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
R	2GH	PRESS SWITCH-RESERVOIR AIR		671	671BB	
R	3GH	PRESS SWITCH-RESERVOIR AIR		571	571BB	
	6GH	PRESS SWITCH-RESERVOIR AIR		147	734	

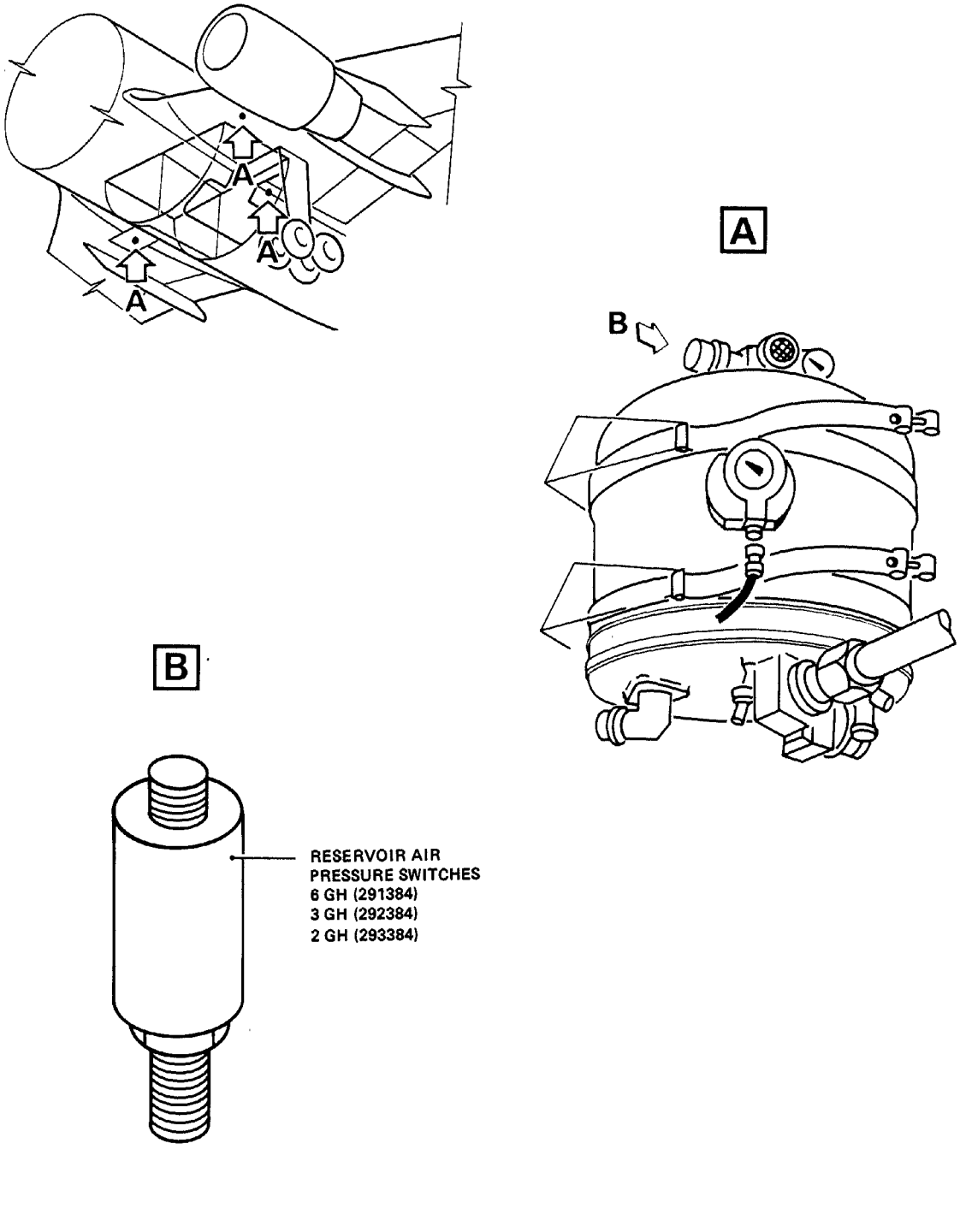


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Hydraulic Reservoir (Exterior)
Figure 001



Reservoir Low Air Pressure Monitoring
Figure 002



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Component Location
Figure 003

1. General
Reversoir pressurization indicating test is bound to reservoir pressurization system functional tests (Ref. 29-14-00, P. Block 501).

RESERVOIR PRESSURIZATION INDICATING - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1-29, Item 10 (RSVR "Air" lt.)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING ON RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

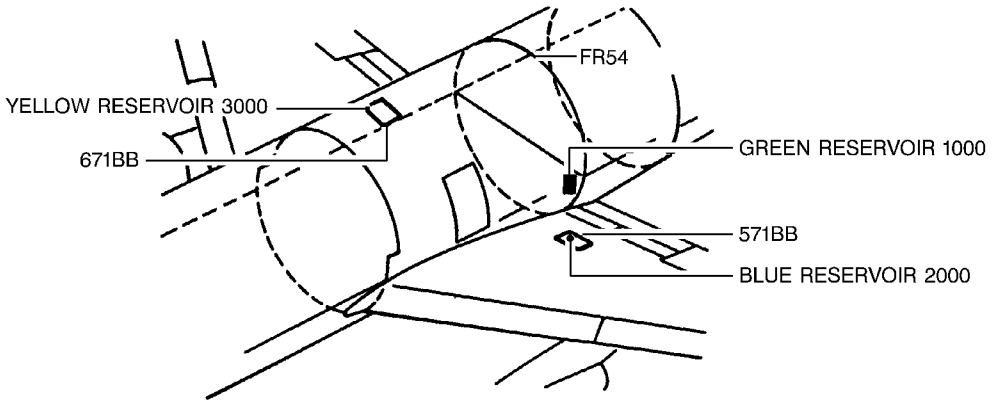
1. Deactivation

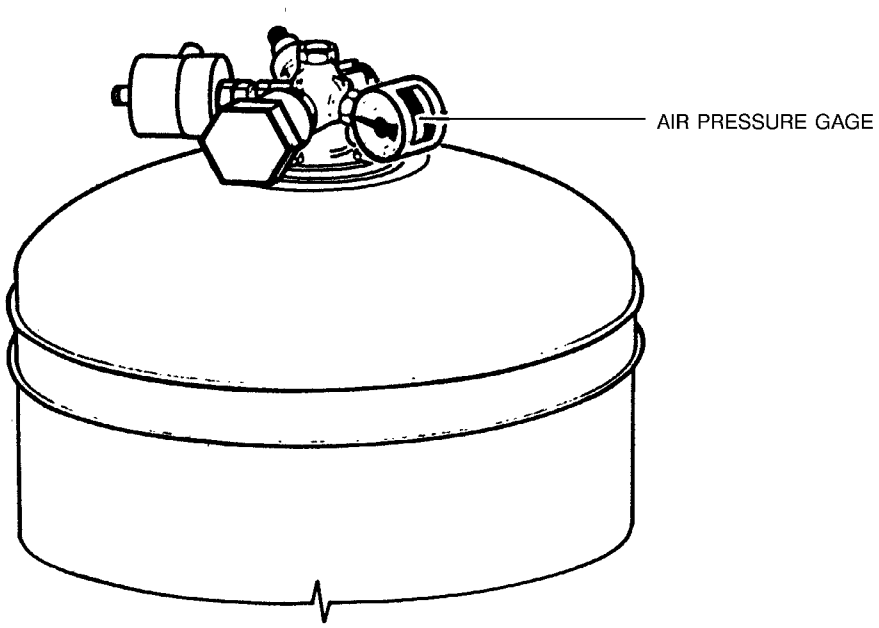
A. Reason for the Job
(1)Visual check when warning annunciator is not operating.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2.6 m (8ft. 6in.)
Referenced Procedures	
- 24-41-00, P. Block 301	A/C External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

C. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(b)Position access platform.
(c)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(d)Display warning notices prohibiting start-up :
- of Green system electric pumps and power transfer units on panel 427VU
- of Yellow system electric pump, on panel 9VU
- of hand pump in hydraulics compartment.
(2)Check
(a)Check that air pressure read on direct reading gage is 50 psi and that there is no pressure drop over a period of 5 minutes.
(3)Close-up
(a)Remove warning notices.
(b)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.
(c)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(d)In flight compartment, on panel 427VU, install a temporary placard to warn the flight crew that AIR legend of G RSVR (B RSVR, Y RSVR) annunciator 59GR (61GR, 60GR) is inoperative.
(e)Make an entry in the aircraft technical log.





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Hydraulic Reservoir
Figure 901

R

2. Reactivation

A. Refer to TSM 29-34

B. Remove temporary placard in flight compartment.